# THE COHESION PROBLEM

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PROEFSCHRIFT

TER VERKRIJGING VAN DE GRAAD VAN

DOCTOR IN DE LETTEREN

AAN DE KATHOLIEKE UNIVERSITEIT TE NIJMEGEN,

OP GEZAG VAN DE RECTOR MAGNIFICUS T. A. BIRRELL,

HOOGLERAAR IN DE FACULTEIT DER LETTEREN,

VOLGENS HET BESLUIT VAN DE SENAAT

IN HET OPENBAAR TE VERDEDIGEN OP VRIJDAG 5 JUNI 1964,

DES NAMIDDAGS TE TWEE UUR

door

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GEBOREN TE BUFFALO, N.Y., U.S.A.

ALBERTS' DRUKKERIJEN, SITTARD

1964

Sincerest gratitude is expressed to the management of the Staatsmijnen in Limburg for their kind permission to perform this investigation on their premises and with their personnel, this representing a considerable financial sacrafice.
Special thanks are due those employees of this industry's Personnel Research and Leadership Training departments who rendered the investigator either professional or administrative co-operation.

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# CHAPTER I / THE MODERN CONCEPTION OF THE COHESION PROBLEM: THE WESTGATE PROJECT

## *I. 1. Small group research*

Some twenty years ago small group research came as a major force upon the psychological scene as a direct result of the pioneering theoretical and experimental work of Lewin (19) [1], the technological contributions of Moreno's sociometry (22), and the pressing need for a more accurate understanding of men in collectivities fostered by the Second World War (39). For the greater part of these twenty odd years it has not only provided a stabilizing factor in the employment situation of sociologists and social psychologists but also a wealth of fact and a relative dearth of useful theory.

Actually, the enormous quantity of independent facts established in small group experiments is an admirable exemplification of the economists' law of diminishing returns. In fact, we can often not see the forest for the trees. One need only review the research on personality variables related to group behavior as one example (21). "Authoritarian personality", "affiliation motive", "birth order", ad infinitum. We collect a thousand facts, most of which are undoubtedly pertinent and valid, but often lacking the necessary interconnection. What is needed is a thread upon which to string these beads, a theory that collects these facts, a frame in which to paint a picture of the unified group as a whole. What would be most welcome are a restricted number of theoretical constructs cutting across this bewildering array of facts, reducing them to a series of meaningful vectors; in short, painting a picture of the group by means of laying bare its dynamics. The present author is of the opinion that a long step in this direction was taken in a series of theoretically orientated interrelated investigations into group process done under the general direction of Festinger (8 and 6, p. 286). Let us turn to these studies and see what kind of picture of the group emerges.

## *I. 2. The problem of norms*

We will make no attempt to present the entire program of research included in the aforementioned systematic program. We shall rather concentrate selectively upon that part of the whole program which serves as a background for the research and hypotheses presented in later chapters. Because we are selecting from the whole to suit our own purposes we shall perhaps at times cause the reader who is acquainted with this program in its entirety to wonder why we go into such detail at particular points and blandly skip over much of the rest.

At this point we can only beg the reader's indulgence hoping that later chapters provide justification for our apparent arbitrariness. Festinger's research had as immediate theoretical background the well known if not classical Sherif-Asch

[1] Numbers in parentheses refer to citation which may be found in the bibliography.

(35, 1) type experiment concerned with so-called "group norms". In the classical Sherif experimental situation the subject's estimate of the distance that a point of light in a darkened room appears to move is recorded under two separate conditions: 1) with the subject in the darkened room alone, and 2) with the subject in the company of other subjects who also render their estimations of the amount of apparent movement in such a manner as to be known to the first subject. These other "subjects" are usually in the confidence of the experimenter and paid to render certain pre-experimentally determined "estimations". The almost universally observed result of these experiments is that the judgment of the bona fide subject when alone tends to change in the group condition in the direction of his "fellow subjects" judgment.

This effect is then interpreted in terms of the bona fide subject's conforming to a hypothesized "group norm" with regard to how far the point of light moved. As a result of these studies it is probably universally accepted by students of social behavior that the behavior of individuals is affected by interaction with their fellows.

The acceptance of the theoretical model of the "group norm" as a convenient way of conceptualizing this problem is widespread. We are as a general rule concerned with attempting to generalize from such restricted and controled experimental situations to what for convenience' sake we may call a "real life" situation.

We are concerned with applying our concept of group norm to natural social situations for practical as well as theoretical reasons. When we do this a number of additional problems come to light.

Let us, for the sake of illustration, dream up such a situation. We will consider the Communist Party as constituting a group and will say that all card-carrying communists are members of this group.

Let us then assume further that there exists in the Russian Communist Party a certain opinion (norm) to the effect that Mao Tse-Tung is a "left-deviationist". Now if we were to sample the opinion on this question of 100 Moscovite communists we might find, say, that 90 of them adhered to this "norm" with regard to perceiving Mao as a left-deviationist and that the remaining ten communists were of other mind regarding the question [2]. We might then, at this point, ask a number of questions. If this overwhelming agreement indicates a group norm how can we adequately conceptualize it at the theoretical level, i.e., what is a "norm"? This amounts to asking how the norm came into existence and how it maintains itself. We should perhaps ask the added question of how it came about that ten of our group members don't adhere to the norm. How is this possible? In just what way did they successfully manage to avoid conforming to the norm? It might further occur to us that had we asked the question of another 100 communists, e.g., 100 members of the Communist Central Committee instead of just any 100 communists in Moscow we might well have found this time that 99 observed the norm and only one did not. It is apparent that these sub-groups of communists differ in some way from each other which has some effect upon observation of the norm regarding Mao. To seek meaningful answers to questions of this type we shall have to know more about the type of group in which the norm is extant.

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[2] We shall, for the sake of argument, not concern ourselves with the question of whether this is in effect a "norm" as opposed to one-hundred opinions independently arrived at. This question involves us immediately in other questions which are at the present time of more interest to us. We shall beg the question for the purposers of this example and assume that it is a "norm".

Theoretical constructs useful in understanding these problems with regard to "norms" represent the principal contributions of Festinger's research program.

### *I. 3. Festinger's research program*

Festinger's research program falls into two separate parts. The first part was a field study of certain social processes in a housing development at Massachusetts Institute of Technology (11) and the second part was an entire series of integrated experiments designed to test experimentally a number of hypotheses concerning social communication growing out of the former research project (8).
In point of fact the theories developed to explain all experimental results in the M.I.T. or Westgate study were developed ad hoc. A number of results were explained, not predicted. These results were for the better part later tested in hypothesis form under laboratory conditions and provided collaborative evidence (8).
We shall principally concern ourselves with the former study and in Chapter II consider in lesser detail those parts of the latter program bearing upon our research hypotheses. We shall also take the liberty of presenting the M.I.T. study as if it had been a hypothesis testing experiment, i.e., for clarity of presentation we shall first present the theory and only thereafter the results of interest to us. It seems, however, first of value to describe the research setting, before turning to Festinger for aid in understanding the circumstance described in our fantasized Mao norm problem.

### *I. 4. The sample in the Westgate study*

A description of the sample used in these investigations will be only as detailed as we feel to be necessary for the later explanation of results relating to Festinger's theories. A detailed description of the sample can be found elsewhere (11, chapter II), we include only its major characteristics. The sample consisted of 270 families of married graduate students attending Massachusetts Institute of Technology. These students were living in two university housing projects just after the termination of the Second World War.
The subjects were characterized by a high degree of uniformity with regard to sociological dimensions (age, class), interests (scientific, industrial), and aspirations. They may be regarded as an exceptionally homogeneous sample with regard to these dimensions.

> "In summary, the people living in these projects were highly homogeneous along the dimensions of occupation, age, class and family background, education, interests, aspirations, and attitudes toward the community in which they lived. They were an older and more mature group than the general run of students at M.I.T. They probably differed from people living in other similar college housing developments in only one way – their interests were much narrower." (11, p. 20).

A second point of interest is the housing development's lay out in the two projects and the length of time that the subjects had resided in the projects. The Westgate court project consisted of 100 single-family houses arranged in nine distinct court units in the shape of a U.
The Westgate West project consisted of seventeen two story barracks with five separate housing units on each floor. The importance of these differences in structural design is that in Westgate most houses faced other houses in the court and this had a marked effect upon contacts among residents of the individual units. This was not the case in Westgate West where units were arranged in a row on each of the two floors in a given barrack. In as much as we will not be

concerned in our own investigation with the influence of ecological factors on the two communities a more detailed description of these structual differences is not presented.
It is, however, important to take note of this general difference in the lay out of the two projects as the relative isolation of certain units in the projects will be of concern to us in weighing certain results in a later section. For the same reason it must be pointed out that Westgate residents had been living in their courts longer than Westgate West residents in their barracks. Festinger notes that two points are of exceptional interest;

*1* There was no aspect of permanency about living there. The residents all regarded Westgate and Westgate West as places to live only while they were students.

*2.* There was no long history of residence in these projects. At the time the field experiment was done the oldest resident had been living in Westgate about fifteen months and in Westgate West only five months (11, p. 17).

An additional point regards the perceptions of the residents in the two communities of their communities. A large majority in both communities viewed their communities as the center of their present social life.
This was established in an interview conducted by the experimenters.

"There is abundant evidence that the high degree of homogeneity among the Westgate residents promoted a congenial social atmosphere. That there was general satisfaction with social life within Westgate has been pointed out. Two facts are clear. First, Westgate people did have the feeling that Westgate promoted friendships and seemed to be satisfied with the friendships they developed. Secondly, there was high dependence upon Westgate for these friendships and little going outside of the project for social activities. The most frequently expressed explanation of this high level of social satisfaction was that 'Westgate is such a congenial community, everybody is the same age and has the same interests and is leading the same kind of life you are.' " (11, pp. 31-32).

This sample of people provided the testing grounds for a number of hypotheses. The sample had a number of advantages and disadvantages from the point of view of investigating social "norms".
In that it was about as homogeneous as one could expect to find in a natural setting many potentially confounding sociological variables typical to such studies were controled by exclusion. This same homogeneity, of course, reduces the generalizability of any obtained results.
Another very strong point in favor of this investigation's sample is its natural setting, its "real life" nature. One has only to compare it to the artificial groups used in most experimentation, as for example in Festinger's second program, to be impressed with the genuineness of the resulting social behavior. There is also a negative side to this question. A thoroughly adequate operationalization of conceptually clear theoretical variables of necessity had to suffer.
Be that as it may, we have here real groups which, as will later be expanded, do seem to develop group norms and do provide a test for some most interesting hypotheses. We now turn to these hypotheses.

### *I. 5. Festinger's theory of the functioning of the group*

In the following pages we shall present Festinger's line of reasoning with regard to groups, norms or standards, communication, conformity and deviation.

The theoretical concept "norm" refers to the common observation of homogeneity within groups regarding a specific something and heterogeneity between groups with regard to this something. In our example, there is a uniform perception of Mao within a group of Russian communists and we might perhaps hazard, a completely different uniform perception of him in a group of Chinese communists. How are we to demonstrate that this is conformity to a norm instead of a number of converging independently arising individual opinions? We might do this by showing the existence of psychological groups that are enforcing the standard in question. One way of doing this would be to show the results of non-conformity for those members of the group who do not conform, i.e., the deviates from the norm. We should have to be able to make predictions with regard to the results of this deviation and would have to show how it came about that they managed to deviate. This would require a detailed knowledge of the group in which the norm occurred and, specifically, how the norm was enforced. Having this knowledge we should then be able to present a more adequate theory of what norms are. We shall first have to consider some of the ways groups can differ from one another.

One way in which groups differ springs immediately to mind. They differ in the degree to which they are attractive to their members, in the degree to which members wish to remain in them. It would probably matter considerably to the Russians in our example that they remain members of the Communist party; it might not matter to any one of them who happens to be a member of a stamp collecting club that he retain his membership in said club. If the members of a group are strongly attracted to the group there are forces acting upon them to remain in the group. The average of these individual forces is referred to as the "cohesiveness" of a group.

> "We shall call the total field of forces which act on members to remain in the group the 'cohesiveness' of that group. The force acting on one particular individual to remain in the group may be low and the group may yet have high cohesiveness if the forces in other parts of the group are strong. Perhaps cohesiveness may best be related to the average magnitude of this force in all parts of the group. It is important, both conceptually and operationally, to pay attention to the direction of this force. There might well be a strong force in the direction of belonging to a particular sub-region in the group but only weak forces in the direction of belonging to the group as a whole. In this case the cohesiveness of the group as a whole would be quite low" (11, p. 164).

The cohesiveness of a group is thus the algebraic sum of all forces toward and away from a given group; a resulting force as it were. Two possible sources of this force toward the group are the attractiveness of the group and the "means control" of the group. The attractiveness of the group refers to how attractive the group is in and of itself to a given member. Attractiveness of a social group is often a question of the attractiveness of one's fellow members in the group. The more agreeable one finds one's fellow members the greater the force acting upon one toward the group and the greater the cohesiveness of the group.

"Means control" refers to the power of a group contingent upon the fact that many human motives can only be satisfied by membership in groups. Membership in the Communist Party Presidium is a necessary precondition to becoming First Secretary of the Party should one entertain such ambitions. The greater the range of control exercised by a given group over the attainment of goals by its

individual members, the greater the force on the members toward the group and the greater the cohesion of this group.

> "We may then derive that the more valent a group is and the greater the number and importance of the goals the accessibility to which are in the control of the group, the more cohesive the group will be." (11, p. 165)

From the concept of cohesiveness of a group we move directly to the concept of internal power of a group. The cohesive group is distinguished by its ability to exert forces upon its members in a specified direction. Because a member of a group finds it attractive in and of itself or because he is dependent upon it for the satisfaction of strong personal needs, the group is able to force him to conform to its wishes. The limit of this power of the group to exert influence upon its members is also the limit of its ability to exist as a whole.

> "We may now distinguish another important property of groups which derives from their cohesiveness. We shall call this the 'internal power' of the group. A group has the ability to induce changes in the direction of the forces which act on the members, its internal power being defined in terms of the magnitude of the change which it can induce on its members. ... Such attempts at induction from the group may come into conflict with forces of the individual member, as might be the case if the group pushed a member to work hard when he felt rather lazy. The magnitude of the change which the group can induce would be defined in terms of the magnitude of this individual force of a member which the group induction can overcome. The magnitude of change the group can induce (its internal power) will be equal to or less than the magnitude of the resultant force on the member to remain in the group (its cohesiveness). If the magnitude of the change the group attempts to induce is greater than the resultant force on the individual to stay in the group (the algebraic sum of all forces acting on him toward and away from the group), the effect would be to have the member leave the group. We may thus derive that the ability of a group to function without breaking up is not only dependent upon the cohesiveness of the group but also upon the magnitude of the change which the group attempts to induce in its members." (11, pp. 165-66)

But this power of a group deriving from its cohesiveness is restricted in its range of application. Groups have, thus, what amounts to the political scientist's concept of spheres of influence. The Communist Party of the Soviet Union could successfully exert pressures on its members in the direction of a uniform perception of Mao as a left-deviationist, but would probably be unsuccessful in dictating these same members' choice of Pravda instead of Isvestia as a daily newspaper. This choice might well be anchored in the personal non-political items occurring, say, in one of these communist papers but not in the other. This choice of newspapers on the grounds of the additional non-political items appearing in them, might well be anchored in other groups of which these same men are members, say, their families, who could successfully exert pressures in the direction of a preference for Pravda or Isvestia, but, conversely, not in the direction of a uniform perception of Mao.

> "It is important to understand not only how much change in force a group can induce in its members but also over what realm of activities the group's internal power extends. This realm of activities over which the group has power we shall call the "power field" of the group." (11, p. 166)

We are now able to construct a certain picture of a group from these theoretical constructs. We may picture a group as a valent object in the environment of its

members. Because the individual is attracted to the group, is dependent upon it, in certain regards the group is able to exert forces upon him. We now proceed to the definition of a group norm or standard.

> "A group standard may be defined as a uniform set of directions which the group induces on the forces which act on the member of the group. Complete acceptance by the members of these group inductions would result, theoretically, in complete uniformity on the particular matter about which the standard exists. The strength of this group standard and the resulting degree of conformity to it which members of the group do show will be related to the cohesiveness and power of the group. The realm of activities in which this group standard is effective will be determined by the power field of the group." (11, pp. 166-67)

We can now provide a uniform series of interconnected theoretical explanations as to how a standard came into existence and how it maintains itself. This occurred through communication. If we assume that the existence of a friendship represents the existence of a channel of communication it follows that our information sources will tend to be our friends. When we are presented a rather concrete problem, to decide, say, the color of another's eyes, we shall not be very dependent upon our friends' estimation of that color. We can judge the question on the basis of so-called objective facts. There exists, in other words, a standard of physical reality upon which we can anchor our judgment. But as regards many of the most important questions in our normal life experiences we have no real physical facts upon which to anchor our opinions. Whether Mao is in fact a left-deviationist would be hard for a Russian communist to establish factually. In these situations our judgments are dependent upon social reality, i.e., the judgments held by others provide the anchor for our own opinions. The others whose opinions serve to anchor our judgments will be for the greater part our friends. In this manner, through communication with a progressively narrowing number of relevant others, a standard arises with regard to what we cannot with certainty establish for ourselves. This standard is, of course, maintained in exactly the same manner. Those not holding to our socially anchored opinions are perceived as odd, unreliable, eccentric, etc., and are thus excluded from any further disturbing contact with us by being rejected from our circle of acquaintances, i.e., our sources of information, our groups. The more important the role of these anchoring groups for the individual, the greater will be their power in enforcing these standards.

> "The more cohesive the group, that is, the more friendship ties there are within the group, and the more active the process of communication which goes on within the group, the greater will be the effect of the process of communication in producing uniformity of attitudes, opinions, and behavior, and the stronger will be the resulting group standard, as indicated by the degree of uniformity among members of the group and the amount of deviation from the group standard allowed in members." (11, p. 175).

We have now at our disposal a convenient theoretical construct, namely, cohesion which will allow us to make very specific predictions with regard to various aspects of group behavior, e.g., maintenance of a group norm, amount of communication, deviation and rejection, etc. This construct, furthermore, is applicable to all groups and cuts across a number of variables, e.g., attractiveness of fellow group members, reward possibilities as a result of group membership, status and prestige resulting upon group membership, activities of the group, etc., reducing them, theoretically, to one vector. Such a construct can serve, then, to

integrate a mass of disjunctive facts serving as a unifying explanatory principle for group behavior.
The measurement of this variable at the operational level should not be too difficult, i.e., a number of operational possibilities spring to mind. Which of these may eventually prove to be most fruitful is a question for research. In our further discussion of some of the evidence presented by Festinger for his theory we shall present his measure of this variable. We shall then turn to the evidence presented in the Westgate study to see in how far Festinger's fancy is born out in fact.

### *I. 6. Introduction to the Westgate study*

As previously mentioned, Festinger's study was concerned with how groups of people in face to face interaction manage to affect the judgments, opinions, attitudes, behavior, etc., of the individual members of these groups. The answer to this question involved a detailed knowledge of how norms were established and maintained with regard to matters of import to a group. This in turn required a sound knowledge of the dynamics of the groups which enforced these norms and a theory was developed to aid in a conceptually clear statement of the problem at the theoretical level. Evidence from the Westgate study that provides a test of these hypotheses will be presented.
We will first be concerned with Festinger's demonstration of the existence of psychological groups which enforced certain norms and later with evidence in the data for specific derivations from his theory. The psychological groups are those from the sample described previously, i.e., the courts in Westgate and the buildings in Westgate West. The norm in question will be described in the following section.

### *I. 7. The Westgate council*

There developed in the Westgate courts the suggestion that the residents get together and form a council for expressing the collective view of the community in discussions with the university and in bargaining for services in the town. A detailed description of the origin of this council, its composition, specific objectives and accomplishments will not be presented here. *(11, chapter III).*
We shall follow the same practice as employed in describing the housing development and present only the facts regarding this council which seem absolutely necessary for our purposes.
The Westgate Council elected an executive committee at first consisting of two representatives from each of the nine Westgate courts and was later expanded to include one representative from each of the Westgate West buildings. The committee met at least twice monthly and all residents in the two communities were urged to attend these meetings personally. In the course of the existence of this council a marked difference in attitude between Westgate and Westgate West residents with regard to the council developed. A vast majority of Westgate West residents attended meetings of the council and showed positive interest in it. The residents of Westgate, however, were pretty well mixed with regard to their attendance and evaluation of the council. However, all residents in both communities were aware of the council's existence and the majority had formed a definite opinion with regard to it. After some six months of the council's operation the investigators, as part of a more general survey, asked all 100 Westgate

families and 166 of the 170 Westgate West families; "We understand there is a tenants organization here. What do you think of it? Are you active in it?" As a result of thorough probing by the interviewers the opinion held by the individual families was obtained and it became possible to assign them to one of four categories with regard to their attitudes toward the Westgate council; 1) favorable-active, 2) favorable-inactive, 3) unfavorable-active, and 4) unfavorable-inactive.

As a result of these interviews it became possible to establish one of the four above listed categories as the predominant attitude toward the Westgate Council for each of the courts in Westgate and every building in Westgate West. Any person within a given court or building who did not show the exact attitude pattern (e.g., favorable-active) of his court or building was considered a deviate from that group pattern.

The investigators were able, thus, to show psychological groups (courts or buildings) within which adherence to a particular attitude pattern regarding a valent object in their environment (Westgate Council) on the part of the individual residents was the general rule. Do these attitude patterns represent "group norms?" In answer to this question the investigators turned to the distribution of attitudes and deviates from the prevailing attitude within a given court or building in both Westgate and Westgate West.

In Westgate West there was homogeneity of attitude toward the council both within individual buildings and between individual buildings. A general pattern of favorable-active attitude toward the council existed throughout the entire Westgate West project. Moreover, Westgate West residents had only been living in the project for four months and had been members of the council for one month when these interviews were taken. The investigators decided that there was no evidence for the existence of group norms in Westgate West and attributed the uniform attitude toward the council to the individual motives of its residents. Quite the contrary situation occurred in the Westgate project. Here there was relative homogeneity of attitude within the individual courts but a wide range of attitude patterns between courts. Moreover, these residents had been living in Westgate for up to fifteen months and had four months experience of the council.

The investigators considered this to be evidence of the existence of a group standard in the Westgate project.

Having thus established psychological groups enforcing group standards in Westgate and not in Westgate West the investigators proceeded to derive testable predictions from their theory.

### *I. 8. Empirical results of the Westgate study*

If there are psychological groups which are enforcing group standards the success of this enforcement is dependent upon the power the group has over its members. If a group does not have much power over its members we may assume that the forces springing from individual motivations will be greater than the force which the group can exert on its members toward observance of the group norm. There will result, then, a lower degree of conformity to the norm in groups which lack internal power. But the internal power of a group is related to the cohesiveness of the groups. The more cohesive the group the more powerful the group will be. We might expect that in Westgate the more cohesive groups would be more

successful than the less cohesive groups in enforcing the particular norm regarding the Westgate Council.

Specifically, there should be fewer deviates from the court norm in the cohesive groups. Furthermore, this should not be the case in Westgate West in as much as the investigators decided against the existence of group norms in this project. We have psychological groups enforcing norms but we still need an operational definition of cohesion in order to separate the more cohesive from the less cohesive courts in Westgate and Westgate West.

The theoretical definition of cohesiveness as "the total field of forces which act on members to remain in the group" was operationalized by taking one of these many forces as representative of the resulting force. This operational definition and measure of group cohesion was the ratio of friends in a given court to friends outside of this court for the residents of the court. The scores obtained from the sociometric question:

> "What three people in Westgate or Westgate West do you see most of socially?" (11, p. 37)

administered to the same people used in ascertaining attitudes toward the Westgate Council (the norm) were employed as data with regard to group cohesion. For example, if in court (or building) "X" 30 choices of the residents of that court were directed toward fellow residents of court "X" and fifteen choices to people residing in other courts (or buildings), and in court "Y" 25 choices were directed toward court "Y" and 20 toward some other court, then court "X" was considered to be more cohesive than court "Y".

This was the initially proposed measure of cohesion in the investigation. However, the authors in subsequent analyses made use of a so-called "corrected" measure of group cohesion. This measure was intended to take into consideration the amount of mutual choice in the group on the supposition that to some degree this reduced the cohesion of the group as a whole. Thus:

> "The measure of cohesiveness which we have used may, however, be considerably improved. The major uncertainty in the measure, as it stands, lies in our inability to distinguish between the cohesiveness of the whole group and the cohesiveness of subgroups. For example, a group of eight people all making choices within the group might or might not have high cohesiveness as a total group. As an extreme illustration, there conceivably might be two subgroups of four people each, every member within each subgroup choosing every other member but without any choices at all between the subgroups. In this case each of the subgroups may have great cohesiveness but the cohesiveness of the group as a whole would be low. Similarly, if in a group of eight or ten people there is a subgroup of three, the total group would be less cohesive than if no subgroup existed. . . .
>
> This effect of tendencies toward subgroup formation may be taken into account in our measure by correcting for the number of mutual choices which occurred. If there were no tendencies at all toward subgroup formation within a group, then the number of mutual choices which we would expect to occur would be quite low. In a group of ten people with each person giving, say, two choices within the group, we would only expect to obtain two mutual choices in the complete absence of tendencies toward subgroup or pair formation.
>
> As the tendencies toward subgroup formation increase, we will expect to find more and more mutual choices. Thus, the existence of mutual choices to some extent decreases the cohesiveness of the group as a whole.

It is, of course, impossible in the absence of more empirical data to decide just how much such excess mutual choice detracts from the cohesiveness of the group as a whole.

... We would not want to subtract the mutual choices completely since the fact that they are mutual certainly does not completely nullify their contribution to the cohesiveness of the group. As an approximation, we shall correct the proportion of "in-court" choices by subtraction from the numerator of the fraction, one-half of the number of mutual choice pairs which occurred." (11, pp. 94-95)

This brings the operational definition in line with the theoretical definition. We can now answer our question concerning the relationship between the cohesiveness of the court and the strength of the group standard. In Westgate the rank order correlation between the per cent of deviates from the court norm regarding the Westgate Council and the corrected cohesion score for the courts was –.74, significant at the 2 per cent level of confidence. In the Westgate West buildings this same correlation was –.27, not significant. There would thus seem to be strong evidence that maintenance of a group standard in a social group is dependent upon the cohesiveness of that group when deviation from the standard is taken as the inverse measure of conformity.

The theoretical explanation for the maintenance of group norms was in terms of the degree to which the individual was attracted to his group and the degree to which he communicated and was communicated to within his group. This being the case we should expect the deviate to give and receive fewer choices within his own group than would the conformer.

"The two variables, attractiveness of the group for the member and amount of communication between the member and the group, should be reflected in the sociometric choices which people gave and received. We should expect that deviates would give fewer choices to others in their court and would receive fewer choices from them. Whether this happened because they were not in full communication with the group or because the group was not attractive to them, the result in the sociometric choices should be essentially the same – the deviates should be sociometric isolates in their court." (11, pp. 104-5)

This should be the case in the Westgate courts where a norm existed but not in the Westgate West buildings where we cannot speak of deviates in the absence of norms.

In the Westgate courts deviates gave and received fewer choices within their own courts at the 7 per cent and 17 per cent confidence levels respectively. Similar comparisons of deviates and conformers in Westgate West yielded no significant differences.

As previously discussed in the description of the Westgate sample certain dwelling units (the corner houses as opposed to inner houses) were relatively isolated from the rest of the court houses, by reason of their physical position, i.e., there was less opportunity for contact between residents living in these units and the remaining residents of the court.

Considering only deviates living in these relatively isolated units we find that they gave and received fewer choices than others in the court at the 3 per cent confidence level. In like manner consideration of deviates living in non-isolated units in the court revealed that they received fewer choices than others in the court but the difference was not statistically significant. These inner-court deviates gave just as many choices to fellow court residents as did others living in the

court. We have, thus, seen some evidence to show that lessened contact (communication) and lower attraction to the group characterized the deviate in the Westgate courts but not in Westgate West buildings.

Festinger concludes:

> "Whether relative isolation brings about deviate status (as seems to be the case for those living in corner houses) or whether deviate status tends to bring about isolation through "rejection by others" (as might be the case with the deviates living in inner-houses) the two things seem to go hand in hand." (11, p. 109)

However, the stronger evidence seems to the present writer to point toward lessened contact as the cause of deviation. "Corner-house" deviates chose and were chosen by significantly fewer fellow court members than were conformers. "Inner-court" deviates chose as many fellow court members as did conformers and, though chosen less frequently by their fellow residents, this difference was not statistically significant. Though the evidence in Festinger's data is not conclusive the stronger support seems to the present writer to be for the lack of communication (in terms of possible ease of contact) hypothesis rather than for the lack of attraction hypothesis. In any event, moderate support for both hypotheses was demonstrated.

From the evidence presented so far with regard to the establishment and maintenance of norms in groups we can form a certain picture of the group that accomplishes this. This group – the cohesive group – consists of an interlocked series of friendships which provide channels for communication. The more friendships the higher the cohesion and the higher the communication concerning matters relevant to the group. This increase in communication leads eventually to a uniformity of attitude and behavior with regard to these matters of relevance.

> "We have seen that once a social group is formed the connections within it also function as channels of communication along which information and opinions flow. This process will tend to make the social grouping more and more cohesive. There are indications that information relevant to the immediate functioning of the social group will be communicated more frequently than information of less relevance. The variety of things which are relevant to the functioning of the group will thus have an important effect on the number of different things about which the group develops standards and about which the group exerts pressures toward conformity." (11, pp. 130-31)

This description could be improved by a more detailed picture of the structure of these cohesive groups. Festinger's definition of group structure should be noted before presenting the differences between more cohesive and less cohesive groups obtained in his study.

> "The concept of group structure as we use it here is somewhat different and narrower than it has been in the hands of other writers. Among sociologists, for example, it has frequently been used to encompass things like status relationships, cohesiveness, hierarchical patternings, and more. We use it here to denote only the positional aspects of a group – that is, the pattern of connections among different parts of the group." (11, p. 152)

Festinger's theory of group structure is then a theory of sociometric linkage. The members of the group are not differentiated as to various roles nor are their sociometric positions in the group related to any additional variables. That a given member of the group is or is not related to any other given group member or combination of group members are the only data presented in his analyses.

One analysis does, however, follow from this definition and is presented by the authors, namely, that of cliques. A clique was defined as three or more members of a group all of whom are connected to one another by mutual choice. Festinger found that cohesive groups were those groups who had cliques that comprised a large proportion of the members of the group. Those groups having cliques consisting of a small proportion of the group members were low in cohesion.

> "These data, then, tend to indicate a strong effect of clique formation within a group on the cohesiveness of that group, and on the effectiveness of a group standard which the group may try to maintain. Courts with large cliques were cohesive and had few deviates, while courts with small cliques were not very cohesive and had many deviates... Courts without cliques could exhibit any degree of cohesiveness or effectiveness of group standard, but when cliques existed, they seemed to become major determinants of the total effectiveness of the group." (11, p. 148)

This is the only evidence presented in the Westgate study with regard to the structure of the group as previously defined.

With this summary of Festinger's theory and data from the Westgate-Westgate West study we end our review of this program of research. The results presented are extracted from the whole body of results to meet our further needs and do not represent a full coverage of all important results from this most stimulating experiment. We do believe, however, that our extractions in no way distort the findings of the study as a whole. We have, at the same time, refrained from any criticism of such definitions as were given for cohesion, communication, group structure, etc. This will be presented in the following chapter when we deal with the rational of our own investigations. Results of investigations other than the Westgate study which employed this conceptual framework will also be reviewed at that time. We can, as a result of these studies, form a picture of the cohesive group. That will be the work of the next chapter.

### *I. 9. Summary*

It was noted that although the science of social psychology is rich in experimental detail it is poorer in meaningful theory. A need was felt for a theory or series of theoretical constructs that could cut across various seemingly different individual facts allowing for a more elementary synthesis. Such a theory was presented; namely, Festinger's theory of social influence in groups. Certain constructs from this theory were presented in detail; the most important of which was the conceptualization of cohesion. Evidence in prior experimentation bearing upon these constructs was discussed in so far as it either illustrated the operationalization of the constructs or delineated the extent to which the obtained evidence allowed for generalization of the findings to other situations. In this connection, some time was spent in discussing the research situation in which Festinger's theory was tested. Explicit criticism of this study was not undertaken as our sole purpose was to provide a background of theoretical and empirical knowledge concerning group dynamics. Both explicit and implicit criticism of Festinger's theory will be provided in the following section when we shall attempt to extend and build upon the theoretical conceptions described in this chapter.

# CHAPTER II / ADDITIONAL THEORETICAL CONSIDERATIONS IN THE ANALYSIS OF THE COHESION PROBLEM

## *II. 1. Introduction to the nature of a hypothetical cohesive group*

In the preceding chapter we have dealt in some detail with the Westgate project. Our purpose was twofold; 1) to provide an empirical background for some ideas about the nature of a cohesive group and, 2) to present the experimental design of this study in sufficient detail to allow criticism of those aspects of interest to us in a proposed further investigation. Let us try to construct our picture of what a cohesive group should be like and then see what evidence was provided in the Westgate and other investigations for this conception.

The generally accepted definition of any group is two or more individuals interacting with each other. This interaction, on the one hand, may be as close to the everyday conception of interaction as was the case in the Westgate study, i.e., neighbors in a community in social intercourse. It may, on the other hand, and in so far as experimental social psychologists are concerned, be as distant in meaning from our everyday concept of interaction as to include subjects in separate rooms receiving communications from the experimenter which they believe to be coming from other members of their group. *(16; and in 6, p. 781).* We can see that there is "interaction" and "interaction" as far as social psychology is concerned.

If, as in the Westgate study, the group under consideration is made up of more than two individuals then we can be sure that these individuals have brought with them into the group a large host of individual motives. This is the same as saying that they all have individual goals which they hope to obtain through membership in the group. One of our hypothetical communists wants to be considered for promotion in his factory, another is interested in Marxist-Leninist theory, a third has many friends who are party members, etc.

Whatever the reasons may be that our various individuals wish to belong to the group, the fact is that each has his own reason and correspondingly his own demand to bring upon the group. The degree to which the group can satisfy these individual motivations will determine the degree to which membership in the group remains rewarding and, consequently, the lifespan of the group.

It is obvious that the individual prior to entering most groups has some idea of whether or not the group in question will be able to serve as a medium for reaching his goal. That is, most groups are organized with respect to the attainment of some specific goal or goals and the prospective group member is generally aware of what these goals are. It is further obvious that the obtaining of specific goals on the part of individual members will, to a great degree, depend upon their relationships with other group members who also have their own specific goals. It follows, consequently, that the ability of a group to stick together is dependent upon the agreement among the individual expectations of the group members. A group comprised of members each having separate diverging indi-

vidual goals will be characterized by friction among the members and a feeling of unity with kindred spirits will not arise. The cohesive group, on the other hand, will be composed of members sharing a unified perception of the common, shared goal.

This similarity of purpose of the members of a cohesive group will have to be expressed in a common plan of action by which the shared goal can be reached. A group characterized by a common goal but no common plan of action for obtaining this goal will split up into cohesive subgroups each with its own plan of action. A good example of this phenomenon can again be taken from the communist movement. So called "Trotskites" and "Stalinists" in the mid-twenties were as one in their goal of furthering world communism but split into warring camps because the former faction wished to begin agitating at once in all countries of the world while the latter faction favored first building socialism in the Soviet Union itself as a base for later world expansion. A unity of both means and ends are prerequisites for the maintenance of cohesion in groups.

This required unity of means and ends is usually expressed in an organizational form. The forces at the disposal of a group are organized so as to maximize their full potential. A differentiation of task, position, and status is introduced into the group to facilitate goal attainment. Stalin leads and Ivan follows. The recognition of these status differentiations is essential to the unified functioning of the whole group. The group in which these interpersonal and organizational relationships are clearly defined, recognized, and accepted is successful in reaching its goal. It provides the rewards upon which the group's further existence depends. The group's members are held together by the common bond of reward.

The efficient utilization of means in order to reach a common goal providing common rewards depends upon efficient communication among distinct parts of the group, i.e., the individual members. Without constant communication among members of a group unified activity in the direction of the group goal would be replaced by disordered and uncoordinated individual actions.

Communication serves another function by introducing unity of action into the group. Through communication those elements in the group whose attitudes or actions are detrimental to the achievement of the group goal become known to others in the group. The group may then exert influence upon these members to change their opinion and/or weed them out of the group in the interests of unity.

Yet another function of communication is the reward function it has for group members in and of itself. Communication among a group homogeneous in attitude and action is reinforcing for the participants, encourages them in their perseverance and assurance of eventual success. Communication, serving these instrumental and consummatory functions is, thus, a trademark of the cohesive group.

We might, then, define the cohesive group as consisting of members who have a common reason for belonging to the group and a common perception of the group as a means toward this goal.

Such a group should have agreement as its most general distinguishing characteristic; agreement as to why members belong to the group, as to what is important for the group, and as to how the group should be organized to serve as an agent in the pursuit of individual satisfactions. Such a group is then prepared to pull together toward the common goal, is characterized by a stick-togetherness, a feeling of "one for allness" because all are really for one.

To what degree do we find support for such a conception in the Westgate study and related investigations? Is our conception of a shared perception of the group on the part of the group's members reflected in the measures of group cohesion employed in these studies? Is there evidence that the members of the group agree among themselves as to what is important to the group and as to why they might wish to belong to the group? What is the nature of the interrelationships among members of the cohesive group? What evidence is there concerning communication in cohesive groups? We shall first turn to the question of how cohesion was defined and measured.

*II. 2. Cohesion measures in Westgate and related studies: criticisms*

Cohesiveness, conceptually defined as the total field of forces which act on members to remain in the group has been criticized by Gross and Martin (12) on the grounds that this conceptualization of cohesion was insufficiently measured at the operational level by the use of a sociometric measurement of proportion of friends inside and outside of the group. These critics further suggested that the choice of this particular index in the place of, e.g. isolate ratio or dislike ratio was entirely arbitrary on the part of the authors. Their first point is well taken. Although the "total field of forces" approach is undoubtedly a thorough description of the sources of cohesiveness, cohesiveness in this sense is simply unmeasurable. Its suitability at the theoretical level cannot be matched at the operational. It is, however, true that a measurement of this resultant force is possible and this mitigates somewhat the sting of the criticism.
Furthermore, with regard to the so-called arbitrariness of the choice of the measure of this resultant force, i.e., the friendship ratio, there is abundant evidence presented by Festinger to support this particular choice. *(11, chapter II).* Gross and Martin did, indeed, seem to ignore a large section of the original publication.
A second argument in defense of the chosen ratio presented by Schachter (33), namely, that it "worked", while refreshingly candid, does seem to lack much strength of persuasion on the basis of the Westgate results alone. As already mentioned, however, a long series of experiments in which attraction measures do seem to have "worked" in the sense of showing meaningful relationships to other variables does improve our confidence in this type of construct and measure (8). Schachter's point, however unelegantly expressed. is borne out by a long series of positive results the interpretation of which would not seem to be as difficult as Gross and Martin suggest.
A second line of attack on the particular measure of cohesion was that various measures of cohesion of seemingly equal appropriateness, do not show significant intercorrelation. In an investigation by Gross and Martin (12, p. 550) friendship ratio, isolate ratio, and dislike ratio, showed no significant intercorrelation.

Eisman (7) designed another experiment to test this proposition of no significant common variance among independent measures of cohesion by obtaining data from fourteen student clubs on five possible measures of cohesion; 1) number of reasons for belonging to the club selected from a list of twenty-one possible reasons, 2) for a given group, the number of these reasons that were shared in common by more than one-half of the group's members, 3) a measure incorrectly named the Gross-Martin question, (33, p. 557) to wit, How attractive is this group to you? answered by all members of a given group, 4) the ratio of

friends within the group to friends on the university campus, i.e., the same sort of measure used in the Westgate study, and 5) the agreement among subjects within a group as to generalized values held as measured by the Allport-Vernon values test. The data obtained indicated that there were no significant intercorrelations among these separate measures of cohesion.

Ramuz-Nienhuis and Van Bergen (30) essentially duplicated this investigation and their data seemed to yield rather mixed evidence with regard to the intercorrelations among cohesion measures. These investigators found significant positive relationships between the so-called Gross-Martin question and all other measures excepting the sociometric measure but found a number of confusing negative correlations also. With the exception of measure number three above the results pretty well conform to Eisman's.

These studies and the original criticism of Gross and Martin's were directed principally at Back's (2) maintenance that cohesion could be viewed as a unitary concept. Back had demonstrated that three separate sources of cohesiveness, namely, attraction to fellow group members, possibility of reward as a result of group membership, and status obtained from group membership led to similar results, namely, greater communication and influence attempts by members of the more cohesive groups.

Back had concluded that in so far as all three sources of cohesion led to similar results that cohesion was a unitary concept. These criticisms of this point of view would also not seem to be damning as one need not assume intercorrelation of sources of cohesion to conclude that the independent sources of cohesion lead to the same results. The rather amusing invective and counter-invective hurled by Schachter (33) and Gross and Martin (12) over this question would not seem worth the effort. One point is, however, worthy of note. Different sources of cohesion can lead to the same results as in Back's experiment. This is not necessarily always the case as can be seen from Eisman's and Ramuz-Nienhuis and Van Bergen's studies. The lack of agreement among independent measures of cohesion which occurred in the latter studies should serve as a warning against single measures of this variable.

A further more practical objection to the measure of cohesion used in the Westgate study is that it is not applicable to a large number of groups available for investigative purposes. In many situations involving groups of considerable interest to social psychology it is not possible to measure cohesion in terms of the ratio of the subjects' attraction to members of the group under study as opposed to members of some other group or groups. There is often no second group to serve as a reasonable alternative source of attraction for these members. This is the case in Festinger's second program, for example (8). In these investigations only a measure of attraction to own group was possible. These global measures of how attractive the group's members were to each other are, however, quite suspect on several grounds. First of all, they are so general as to force the subject into a sort of all-or-none judgment, denying him the opportunity to view the group as attractive in some specific regards, unattractive in others. It might be reasoned that a measure of the individual perceptions of many separate aspects of the group, e.g., its goals, members, etc., would serve as a better measure of the "resultant force toward the group" than would a global estimation of how attractive a group was without separate reference to any particular dimensions of attraction. Secondly, and relatedly, the subject's answer to a single question, "How attractive was this group to you?", would be highly suspect if on nothing else than on the grounds of unreliability.

Yet another line of criticism directed at Festinger's cohesion definition is that it is not a measure of cohesion at all but rather a measure of attraction-to-group (4). This would indeed seem to be a telling criticism as Festinger's employment of cohesion and attraction as equivalent terms is certainly arbitrary. An adequate conception of cohesion should consider group members' perceptions of the possibility of leaving the group as well as its attractiveness in terms of friendship relationships within the group, to give one example. We might belong to groups that are cohesive and unattractive (the army) or attractive but not cohesive (certain professional organizations). Attractiveness is not cohesiveness, though an important determinant of it.

With regard to the concepts of cohesiveness employed in the Westgate and further investigations employing similar attractiveness measures we might conclude: 1) the conceptual definition is untestable, 2) the low intercorrelations of several apparently equally meaningful operational definitions negate the advisability of using single measures of cohesion, 3) were this not so the reliability of single measures would still be suspect, 4) the equation of cohesion with one of its components, attractiveness of the group, is arbitrary and unjustified.

We do not contend that Festinger's attraction measure of cohesion is not one legitimate measure of cohesion, only that it does not account for all of the variance involved, i.e., it is not equivalent to cohesion. We must, therefore, propose a better definition from a measurement point of view. We will define the cohesive group as a group the members of which display shared positive perceptions of their group, its means, paths, and goals. By "shared positive perceptions" we mean that the members of a group are united by their common evaluation of the group as a valuable means to a particular end or ends. "Means" refers not only to the material instruments at the disposal of the group but primarily to the members of the group itself. "Paths" refers to the group's proposed methods of goal attainment, "goals" to the common objective or objectives of the group's members.

It is not untrue that these "positive perceptions" could be viewed as nothing more than the result of attractions for the members toward the group as in Festinger's definition. The point is that since anything and everything could be collected under this rubric it seems to the present author a danger that this might lead to a combining of different components into one common term without first showing that this is justified. This obfuscates understanding of the matter by oversimplifying the multi-component concept cohesion. Correspondingly, emphasis upon perception of group means, paths and goals brings a certain degree of differentiation into the concept at the nominal level thus serving as a deterrent to undifferentiated measures at the operational level, e.g., the global attractiveness measure.

One could, of course, preface such terms as "means of group", "paths toward goal" and "goal" with the term attractiveness, e.g., "attractiveness of group means to members", etc., which is at best redundant. Coupled with the fact that not all cohesive groups are attractive to the members in any but a strained conception of the term "attractive", it seems wiser to present another nominal definition of cohesion.

Our problem at the measurement or operational level will, in the light of above mentioned criticism, require a more fundamental break with previous studies than did our nominal definition. Our problem in the latter case was essentially one of presenting a nominal definition that would correspond better to the

required measurement of our concept at the operational level; in the former case, one of constructing this measure.
The cohesion of groups has been measured at various times by a host of different gauges, many of which have already been discussed. We have, however, in our criticism weighed them in the scales and found them wanting as single measures of cohesion. We objected to the Westgate sociometric ratio because of the existence of other equally meaningful sociometric measures which might lead to contrasting results. The measure is not applicable to many samples, in particular, to our own as will later be seen. Additionally, when sociometric measures are employed to measure cohesion they can not be used to measure such interesting dependent variables as group structure. We shall need an independent cohesion measure to investigate social structure by means of the sociometric techniques particularly appropriate to this task. We objected to simple global attraction scales, and in like manner to any single measures, on the grounds of their inherent unreliability. The only approach open to us is the development of our own measure. We shall not ignore the many measures of cohesion extant in the literature or inherent in established relationships between so-called "cohesive" groups and certain dependent variables.
Rather we shall develop a new proposed measure from this fund of knowledge and then shift the chaff from the grain by empirical investigation. The development of a new cohesion test will be the work of the following section. We must now return to our original set of questions concerning our knowledge of "cohesive" groups.

### *II. 3. Group cohesion and agreement in the group: introduction*

If, as we maintain, agreement is a distinguishing mark of the cohesive group, then there should be some evidence to that effect in the Westgate study. Some evidence bearing upon this point is to be found in the smaller amount of deviation from a group norm with regard to the Westgate Council in cohesive groups. We may interpret this as conformity among the members of cohesive groups with regard to a group norm. Similar evidence is presented in a study by Schachter (32, and in 6, p. 260). During a discussion task three experimental assistants, unknown to bona fide subjects in the group, were assigned by the experimenter the task of assuming three separate degrees of agreement with the predominant opinion in the group during these discussions. These different degrees of agreement or roles played by the assistants in the group were, respectively, the "mode" characterized by complete agreement on the assistants' part with the prevailing opinion in the group, the "slider" who first disagreed with the group and only later came around to their position, and the "deviate" who obstinately held to a position totally opposed to that of the group's bona fide members. Results of a questionnaire completed by bona fide subjects indicated that in cohesive groups the "deviate" was assigned to lower functions in the group than were either the "mode" or "slider".
The first observation which might be made is that the only type of agreement demonstrated was agreement with regard to who did not belong in the group. This is, of course, agreement with regard to a rather extreme sanction against deviates and probably serves as an inadequate measure of agreement in a group. One might find a high degree of agreement in a group even in the absence of agreement with respect to such extreme matters as rejection of a fellow group member. Deviation and rejection as operational measures of agreement depend

upon the existence of specific norms of crucial importance to the functioning of the group. In the absence of such situations they may not prove to be particularly profitable indices of agreement. Even in the presence of such norms, deviation should prove to be a less than optimal measure. For example, high agreement between two group members could still be accompanied by rejection. If members X and Z both regard member Y highly they might tend to reject a member A simply because Y disliked him even though X, Z, and A were in agreement concerning some matter of relevance to a group. Or, conversely, low rejection might follow even with low agreement among members as a result of many extraneous factors, e.g., there could be strong barriers to rejecting the deviate, extra group friendship with the deviate, etc.

The upshot of this is, of course, that the concept of uniformity as used by Festinger and measured by deviation can not be considered equivalent to ours of agreement. If this be accepted the entire program of Festinger's, while presenting strong evidence with regard to the relationship between cohesion and conformity, is only suggestive as to the relationship between cohesion and agreement. It is our proposition that agreement among members of cohesive groups characterizes these groups. This follows implicitly from Festinger's theory but not from his data. We shall, therefore, have to specify certain areas of agreement that appear to us to be worth investigation and propose methods for testing these propositions. Agreement among group members could, of course, occur with regard to almost anything. Our task will be to choose those areas of potential agreement of most significance for understanding group processes.

### *II. 4. Agreement as to reasons for group membership*

A group in which the individual members have similar expectations from membership in the group will be better able to serve as a medium for satisfying these expectatons. There will be less conflict of interests. The resulting reward effect should foster a uniform favorable perception of the group on the part of its members.

Newcomb, (26, pp. 12-14) in his researches into the basis of interpersonal attraction, has proposed a concept "strain", similar in nature to Heider's (14) "balance" and Festinger's (9) later concept of "dissonance". He derives this from Festinger's "social reality" principle (8) and the older concept of reciprocal reward. When there occurs discrepancy between two or more persons with regard to a particular attitude a force arises to minimize the discrepancy between them. This force is called "strain." The dynamics of this force lie in the fact that we are dependent upon others for the anchoring of our beliefs, attitudes, opinions, etc., and thus, to the degree that communication from another supports our beliefs, etc., it will serve as a strain reducer.

> "In so far as communication results in the perception of increased similarity of attitude toward important and relevant objects, it will also be followed by an increase in positive attraction." (25, p. 579)

If we assume therefore, that the group is an important and relevant object for its members and that through communication the members of the group become aware of the individual expectations their colleagues have from membership in the group, i.e., their attitudes toward why the group is of value, we may assume that the more similar these individual attitudes, the more rewarding the interaction and consequently, the greater the chance for a uniform positive perception of the group to arise. A similarity among members in their reasons for desiring

membership in a group should characterize the members of a cohesive group. Our first hypothesis is to the effect that:

> More cohesive groups will show more agreement among their members with regard to reasons for group membership than will less cohesive groups.

This agreement among the members as to reasons for group membership should serve as a point of common reference for the individuals in the group, as the cement for the binding of the individuals together into a unified whole, seeking common paths to shared goals. We must expect, then, to find agreement among individual motives for group membership going hand in hand with high cohesiveness.

One further point with regard to the use of the "agreement as to reasons for group membership" variable in cohesion research seems worth making. This variable may be used as an independent variable which determines the cohesion or as a dependent variable which varies with the level of cohesion. Agreement among the group's members as to why the group is of value to them could, on the one hand, serve as a basis for consensus in the group in which case it would serve as an independent variable. On the other hand, this agreement could arise as a result of a developing unitary perception of the group by its members which was determined by other components of the cohesion variable, e.g., the group's success in obtaining its goals. "Agreement as to reasons for group membership" may, of course, not be used as a measure of cohesion and an independent variable related to this measure of cohesion in the same experimental setting. Whether used as independent or dependent variable we should expect the agreement among members of more cohesive as opposed to less cohesive groups to be significantly higher.

### *II. 5. Agreement as to group tasks*

A primary distinguishing characteristic of all groups are their activities. For some groups these activities represent the group's *raison d'être* e.g., hobby clubs, sport clubs, etc. In other groups the activities play a subordinate role to the groups' goals, e.g., religious groups, reform groups, etc. It would be difficult in a number of cases to draw a sharp line between a group's activities and its goals. We may safely conclude that after the members of the group and the interrelationships that arise among them, one may consider the activities of the group to be of the highest priority of importance to the group's members.

One distinguishes between two conceptually separate types of activities occurring in groups. The first might be called non-goal directed activities which undoubtedly occur in all groups and would include those personal and individual activities engaged in by the group members for their own sake, e.g., parties, outings, casual conversation, etc. The second type of activities, which we may refer to as goal-directed, are the means employed by the group to obtain a given objective. These activities differ from group to group and tend to be more formal in nature than are non-goal directed activities. They might be called the tasks of the group. We will be concerned with this latter category of activities. It should be obvious that for a group to achieve any unity or esprit, any consistent purpose and plan of action, there must be agreement among the members with regard to the evaluation of these tasks. Since we have described the more cohesive group as having just these qualities in greater measure than the less cohesive group the following hypothesis follows:

More cohesive groups will show more agreement among their members with regard to the group's tasks than will less cohesive groups.

### *II. 6. Mutuality of evaluation among members of the group*

Certainly no aspect of a given group will compare in importance to its members with the interrelationships established among these members during the course of the group's existence. This variable, we dare say, overshadows the group's means, goals, activities, etc., in almost all groups. We might find exceptions to this rule as, for example, with regard to the dominant role played in some groups by the groups' goals. It should, however, remain true for these apparent exceptions that the importance of the goals is dependent upon an evaluation by the groups' members. Every act of individual human behavior is colored by the actual or implied existence of orientations toward others. Human behavior is, therefore, always social.

The interpersonal relationships established in groups are of central import for the existence and functioning of groups. If more cohesive groups are distinguishable from less cohesive groups they should be distinguishable on this dimension. Since we have maintained that agreement is a distinguishing feature of cohesive groups, then differences in agreement with regard to aspects of these personal interrelationships in a group must distinguish more cohesive from less cohesive groups. One of these aspects would be the degree of mutuality of evaluation of interrelationships by those members involved. Specifically, that the evaluation of a given interrelationship by one of the members of the relationship will tend to agree with the other member's evaluation in more cohesive groups. Technically, the dyadic relationships will be balanced in more cohesive groups to a greater degree than is the case in less cohesive groups.

Now simply the hypothesis that A's evaluation of B will vary with B's of A is hardly startling and is in fact strongly supported empirically. That this relationship is dependent upon the cohesion of the group in which the relationship occurs, if not immediately evident, is equally logical. If in a given group any degree of co-operation is to be expected among members, balanced interpersonal relationships must serve as the medium for this co-operation. If A can get along with B, who can't stand him but highly evaluates C, who in turn dislikes B, and likes A, who doesn't like him, we should expect little unity in the group. Such a situation would lead to constantly approaching the wrong man and avoiding the right one. The group might have high co-operative potential that would never be utilized. Knowing where one stands with regard to others in the group is a prerequisite for unified action. If the cohesive group is characterized by unity of action then:

Mutuality in evaluation of interpersonal relationships will be higher in more cohesive groups than in less cohesive groups.

It would seem to be worthy of explicit mention that by "mutuality of evaluation" we do not exclusively mean "reciprocal choice" as employed in most sociometric literature to mean reciprocated positive choice. By mutuality we mean that when A negatively evaluates the interpersonal relationship A-B, B evaluates it in like manner; if A positively evaluates it, B follows suit. We are dealing with balanced relationships not with reciprocation of positive choice.

The reciprocation of positive choice phenomenon under certain circumstances is known to reduce the effectiveness of the group. (15) That reciprocal choice qua

reciprocal choice reduces the cohesion of a group is debatable. This seems to be related to more detailed knowledge concerning the exclusivity of the reciprocal positive choice, i.e., whether and how the group's sub-structures (resultants of the reciprocal choice) are related to the group's structure as a whole. The reader will notice that this casts Festinger's "corrected" cohesion measure in a somewhat dubious light. The more so since his own data demonstrate that the relationship between cliques (sub-structures) and the cohesiveness of the group depends upon how the cliques are related to the rest of the structure of the group in which they occur. (11, p. 148) While these observations have consequences for the evaluation of conclusions from the Westgate study it is sufficient for understanding of the preceding hypothesis that mutuality of evaluation not be confused with reciprocal choice.

### *II. 7. Mutual Choice*

It is not only meaningful to inquire as to the degree of balance in the mutual interrelationships among members of a group but also as to the nature of this balance, i.e., positive balance or choice versus negative balance or rejection, and where it occurs in the group. We should, moreover, have some theoretical reasons for predicting a greater degree of a particular kind of balance in certain parts of the group. If certain members of a group are alike in showing a high positive perception of the group we would tend to expect a higher positive balance (reciprocal choice) among these members' interrelationships. That is, those members who are most involved in the group will tend to choose other members who are highly involved in the group over fellow members who are less involved in the group. This can be shown to be an application of one of Newcomb's attraction hypotheses.

> "Attraction toward a co-communicator (actual or potential) varies with perceived similarity of attitudes toward the object of communication." (25, p. 578)

If the group is accepted as a relevant valent object for its members then those members who highly value it should be attracted to fellow members of similar conviction in so far as they are aware of this similarity between them. We may then formulate the following hypothesis:

> More adhesive group members will evaluate fellow adhesive group members higher than less adhesive group members.

### *II. 8. Agreement in the group as to members' status in the group*

The preceding hypothesis with regard to the nature of agreement among group members concerning interpersonal relationships in the group serves as a bridge to hypotheses concerning the structure of a group. We have predicted higher agreement in cohesive groups with regard to mutual relationships in the group. It is also pertinent to inquire as to the agreement among the group's members as to how the group as a whole is structured. We are referring here to "structure" in the usual sociometric sense of differentiation among members on the grounds of their preference status with the other members (46). In cohesive groups there should be agreement among members as to interpersonal relationships, i.e., balance. In addition we would expect agreement among members as to the importance or unimportance of each individual member to the group. If cohesive

groups, as implied, are characterized by a unity of purpose, then members should be employing a uniform standard in evaluating other members' interrelationships within the group. The evaluation of the group's members with regard to this uniform standard should in more cohesive groups be facilitated by a reduction of the barriers to communication with resultant increase of information spread in the group. This information increase in the absence of autistic processes and combined with a common standard of judgment, namely, the benefit of a given individual to the group, should result in uniform judgments with regard to all interrelationships within the group. We derive then:

> Agreement will be higher among members of high as opposed to low cohesive groups as to the hierarchical structuring of their groups.

Some evidence for this position can be found in the Westgate study as well as in an investigation by Schachter (32). In both studies group members tended to agree that deviates from the norm did not belong in the group. We do not know, however, if the group's cohesion bears any relationship to the agreement among members as to how the group as a whole is organized. We are, presumably, interested in those members who remain members of the group as well as those who do not. Is there agreement among the group's members with regard to the finer differentiations in structure within the group, i.e., with regard to the positions of the non-rejected members in the group as well as to who should be rejected from the group?

### *II. 9. Members' perception of own positions in the group*

If the cohesive group is characterized by balanced interpersonal relationships as well as agreement among members with regard to the non-interpersonal interrelationships, i.e., the positions of the members in the group, we might further speculate that the cohesive group's members would be more accurate in their perception of their own position in the group. This is a particularly interesting type of agreement; agreement between one's own estimation of one's interpersonal relationships in the group and others' estimations because it provides a measure of the degree of autism operating on the judgments of the members. Autistic forces are, of course, always operative when questions of the self are involved and for this reason we would expect individuals to tend to value themselves as group members higher than their colleagues value them. Autistic forces acting upon individuals' judgments of their interrelationships with the group will, however, be supplanted by realistic forces in as far as the individuals receive accurate communication from fellow members. We propose, therefore:

> Group members' estimates of their own positions in the group structure will be more accurate in more as opposed to less cohesive groups.

### *II. 10. Communication level in the group*

We have in the above hypotheses proposed a number of specific types of agreement to be expected in cohesive groups. We have referred in our discussions of the theoretical justification for these speculations to several causative factors, the most important of which was communication among the members of the group. It is, presumably, indisputable that a high level of communication is a prerequisite to agreement. If agreement varies with the cohesion of the group,

what evidence do we have that cohesive groups display a high level of communication?

It will be remembered that in the Westgate study the amount of deviation from the group norm was higher among residents living in the more isolated dwelling units. It is a straightforward extension of the propinquity principal to assume that this spatial barrier to contact led to a reduction in communication to residents living in the isolated positions. A low level of communication in this sense of the term was, thus, positively related to the amount of deviation which was in turn negatively related to the cohesiveness of groups. Festinger (11, pp. 120-21) presents other evidence, though extremely scanty, to support his theory that communication follows lines of friendship. If we were to accept his measurement of cohesion, the friendship ratio, this evidence would also tend to support the proposed relationship between cohesion and communication. However, the measure of communication in terms of ease of contact is clearly inadequate and the equation of friendship and cohesion is also untenable.

Back (2) designed an experiment specifically to investigate the relationship between cohesion and communication. He formed a number of dyadic groups on the basis of three sources of cohesion; 1) the attractiveness of the partner in the group, 2) the possibiliy of reception of reward for participation in the group and 3) possibility of obtaining prestige as a result of membership in the group. Under each of these conditions the level of cohesion (high or low) was manipulated by experimental induction. For example, the experimenter first had the subjects fill in a bogus personality test and then later informed them that they had been assigned on a "scientific" basis to either a group in which they should like their partner "a lot" (attractive-high cohesive) or to a group in which they should get along "alright" with their partner (low attractive-low cohesive). The investigator's induction was, presumably, to serve as a *deus ex machina* in the creation of cohesion. No independent measure of cohesion was employed. The two subjects were presented the task of independently writing a story about three pictures which they received. After the stories were written a discussion between the two was held in order to decide how the original stories could be improved. This interaction situation was then followed by a rewriting of the story as in the initial condition.

The results of this investigation outshone its design. In the cohesive groups independent of the source of cohesion involved, the discussion proceeded at a more intense pace with more attempts at influence being exerted by the members involved. These results would certainly constitute support for the hypothesis that cohesion is related to a high level of communication in the group if we could ignore the lack of evidence for differential levels of cohesion in the groups.

A number of reservations will, in the light of the experimental design, have to be made to Back's conclusion. In the first place, in Back's experiment we are dealing with dyads and, while these fulfil the nominal requirements of a group, they do not provide a good sample for generalization to larger groups. The problems of the interrelationships among variables in dyadic "groups" probably represent a quite distinct area of study within the general area of group dynamics (17). Many important questions about communication such as who communicates to whom lose their meaning in these groups.

A second point previously alluded to is the absence of an independent measure of cohesion in this study. We can only conclude that intense communication is the result of the influence on the subject of Back's ruse.

A third problem is that in this study, the communication involved occurred in

one setting of the group only. We have no information to the effect that this high level of communication in cohesive groups is a durable effect. In order to be able to conclude that high communication is maintained through the history of a cohesive group we should have to study groups that have a longer life span. This would appear to be a matter of some importance as we should imagine that the rate of communication tends to increase with the growth of cohesion in the group. The "instant" cohesion in Back's study is a most inadequate measure of the independent variable for research into communication phenomena.
Although Back's results do not provide unequivocal evidence for the relationship between cohesion and communication in groups they do jive with somewhat similar results of Schachter's (32) and of Stemerding's (37). The measures of cohesion employed in both of these studies were, however, confined principally to the general "attractiveness" measures criticized earlier in this chapter. Be that as it may, there are compelling theoretical reasons for expecting high cohesion and high communication to be positively related and we propose to test the hypothesis that:

> The level of communication in more cohesive groups will be higher than in less cohesive groups.

This hypothesis will, additionally, be tested in a natural sample and by employing a more appropriate measure of group cohesion.

### *II. 11. The direction of communication in the group*

It is not only important to know how much communication occurs in a group but also toward whom the communication is directed. Fragmentary evidence is presented in the Westgate study which indicates that the communication is directed toward friends in the group. This, of course, is as it should be. Festinger and Thibaut (10) as well as Schachter (32) have shown that the members of a group holding the dominant point of view tend to communicate this to those members who deviate from it. This process is replaced by one of rejection if the deviate does not change his point of view in the direction of that of the conformers. An equally likely proposition is that communication will be concentrated to a great extent upon those members of the group who are most interested in the group, i.e., those with the highest individual cohesion scores. These subjects, referred to in our nomenclature as "adhesive" subjects, because of their identification with the group should serve as focal points for the exchange of ideas in group discussions.
Their active interest in the group will lead them to initiate discussion with other members which in the normal course of events will be reciprocated. They should be, literally, in the middle of discussions in the group. We may then propose that:

> More adhesive subjects will be more highly communicated to than will less adhesive subjects.

### *II. 12. Who communicates to whom?*

If we further assume that the group represents a relevant object in the environment of its members, an object capable of eliciting positive or negative orientations toward it on the part of these members, we may apply Newcomb's hypothesis that similarity of orientations toward an object on the part of these persons

will lead to the desire for reinforcing contact among them. Since adhesive subjects share similar perceptions of their group it follows that:

> More adhesive subjects will communicate more to fellow adhesive subjects than to less adhesive subjects.

### *II. 13. Evaluation of fellow group members*

We have previously discussed both the problem of balance in interpersonal relationships and the hypothesized tendency of subjects highly identified with the group to choose fellow group members of similar conviction over those group members lightly identified with the group. This latter problem can be expanded by a consideration of the choice behavior of all subjects in a group determined by the cohesion level of the group. There are here two propositions consistent with our theoretical position regarding the effect of cohesion on relationships within the group. We should expect that the members of more cohesive groups both more highly evaluate more fellow group members than is the case in less cohesive groups and, additionally, reject fewer fellow group members. The reader will notice that by concentrating on the extremes of the obtained distributions of evaluations in future analysis of data on this problem, i.e., upon very high and very low evaluations of fellow members, the affirmation or negation of one of these opposed relationships would not necessarily result in a like decision as regards the other. These two relationships, representing extreme evaluations, are independent of one another. Both would seem required of our conception of the cohesive group. We propose, therefore that:

> High evaluation and/or low rejection of mutual interrelationships will be more prevalent in more as opposed to less cohesive groups.

### *II. 14. Centralization of group structure*

An additional question of considerable import for the study of group structure relates to the actual differentiation of the groups' members as regards their popularity or choice status. Newcomb (26, pp. 148-49) has shown that this phenomenon develops with length of acquaintance, i.e., that differentiation of subjects as targets of friendships increases with increased contact among these subjects.
There should be, in cohesive groups, a pyramiding of choice from which develops a hard core of popular members that serves as the nucleus holding the group together. A centralized choice structure, the result of differentiation among members in this respect, should accompany high group cohesion. Therefore:

> More cohesive groups will have a more centralized group structure than less cohesive groups.

### *II. 15. Clique formation*

An additional aspect of the structure problem, namely, that of the relationship between cohesion and clique formation, has been touched upon by Festinger. As previously described, his data indicated that when cliques were present their number and size bear a constant relationship to the cohesion of the group. These

results can, however, only be considered tentative in that; 1) the measures of clique formation and of group cohesion were derived from identical data, i.e., the friendship choices made by the subjects, and 2) the obtained relationship could not be demonstrated for the sample as a whole, but for selected parts of it, and where the relationship did occur it was not statistically verifiable. An independent measure of the cohesion variable is a prerequisite for testing this hypothesis. As prior evidence in the literature presents unsubstantial theoretical grounds for a directional hypothesis our hypothesis is to the effect that:

> More as opposed to less cohesive groups differ as to the nature of clique formation occurring within them.

### *II. 16. Summary*

Festinger's measurement of cohesion was criticised on both logical and empirical grounds. It was argued that while this measure could not be convicted of arbitrariness in Festinger's particular study it might well be arbitrary in other situations.

The measures of cohesion employed by Festinger in the Westgate study and by his colleagues in other investigations were also attacked on the grounds of empirical evidence found in the literature.

The measures of cohesion involved in these studies were rejected for our future experimental purposes and the problem of developing a new measure of cohesion left to Chapter III.

A proposed investigation of cohesive groups was discussed in which a number of hypotheses were presented. Theoretical foundations for these hypotheses were presented. One central idea underlying several of the hypotheses was discussed; namely, that of "agreement". It was argued that members of cohesive groups should show mutual agreement among themselves as regards various dimensions of the group's organization and function. This was believed to be implicit in the theory of cohesion but unsubstantiated in experiment.

The hypotheses underlying our proposed investigation may be summarized as follows:

*1* More cohesive groups will show more agreement among their members with regard to reasons for group membership than will less cohesive groups.

*2* More cohesive groups will show more agreement among their members with regard to the group's tasks than will less cohesive groups.

*3-A* The level of communication in more cohesive groups will be higher than in less cohesive groups.

*3-B* More adhesive subjects will be more highly communicated to than will less adhesive subjects.

*3-C* More adhesive subjects will communicate more to fellow adhesive subjects than to less adhesive subjects.

*4-A* Mutuality of evaluation of interpersonal relationships will be higher in more cohesive groups than in less cohesive groups.

*4-B* More adhesive group members will evaluate fellow adhesive group members higher than less adhesive group members.

*5* Agreement will be higher among members of high as opposed to low cohesive groups as to the hierarchical structuring of their groups.

*6* Group members' estimates of their own positions in the group structure will be more accurate in more as opposed to less cohesive groups.

*7* High evaluation and/or low rejection of mutual interrelationships will be more prevalent in more as opposed to less cohesive groups.
*8* More cohesive groups will have a more centralized group structure than less cohesive groups.
*9* More as opposed to less cohesive groups differ as to the nature of clique formation occurring within them.

# CHAPTER III / DEVELOPMENT OF A TEST OF GROUP COHESION

## *III. 1. Objective*

In the preceding chapter we have presented some ideas and hypotheses about cohesive groups which we believe to be derivable from previous research and theory. During our discussion of prior research in this area we concluded that measurement of the cohesion variable was inadequate for several reasons and if we wish to test our hypotheses about cohesive groups we shall first of all have to develop a measure of cohesion to our liking.

What are the demands which we will make upon a measure of cohesion? First of all, as we have seen, it must be multifaceted, tapping several sources of cohesion. These various sources of cohesion must, moreover, show an overall unity, they must hang together and form a whole. If, however, we are to demonstrate such a unity among parts of the whole we shall be involved in an empirical investigation and not a logical dispute. We shall, therefore, require that our obtained measure of cohesion be reliable in the statistical sense and validly discriminate between groups independently known to be more cohesive and less cohesive. The problem of obtaining a measure of cohesion will thus involve not only developing a logically satisfactory measure possessing so-called content validity but, additionally, testing said instrument in an appropriate sample to ascertain its empirical validity, if any. This work will be preparatory to proceeding to test any of our hypotheses concerning cohesive groups. Let us proceed by, first, proposing a logical, multifaceted measure of cohesion; secondly, by describing a sample in which this theoretical instrument can be put to the test of experiment; and finally, examine some analyses concerning the empirical value of our theoretical instrument.

## *III. 2. Scoring units of the cohesion questionnaire and/or test* [1]

The initial step in the development of a cohesion test was the selection of content for this test. We shall refer to this unvalidated measure of cohesion as the" cohesion questionnaire" and later, after presenting evidence for the validity of some parts of it, we shall refer to the validated section of the questionnaire as the "cohesion test".

The term "cohesion questionnaire" refers, thus, to the proposed measure of cohesion as employed in its entirety in the validating pilot study and the term "cohesion test" will refer to only that part of the original cohesion questionnaire shown to be a valid measure of cohesion in the pilot study and later employed in the experiment proper.

The content of the cohesion questionnaire consists of 22 questions answered by

[1] Appendix I.

the subjects of a group about their group. Beneath each question in the questionnaire was a continuous bi-polar scale, 70 mm in length, upon which the subject was to place a mark at that point on the scale indicating his estimate of his own opinion regarding the question. The questions were so constructed that the farther to the left hand side of the scale that the subject placed his mark, the more positive his perception of the group on the given dimension. This distance from the extreme right or negative side of the scale to the point indicated by the subject's mark could be measured and a value from 0-70 assigned to each question in the cohesion questionnaire for any given subject.

The above situation, with regard to scoring subjects' responses, prevailed with the exception of one question or item in the questionnaire, namely, item number two. This item consisted of a checklist of twenty-six possible reasons for wanting to belong to a particular group, the subject indicating for each separate reason whether or not it served as a motive for his desiring membership in the group. This checklist yielded, thus, a score ranging from 0-26, depending upon the number of reasons checked by a given subject. This obtained value for each subject was converted linearly to a value on a 0-70 scale to facilitate its inclusion in analyses regarding the other questions in the cohesion questionnaire. It was thus possible to assign a value ranging between 0-70 to each subject's response to selected questions concerning dimensions of his group; the higher the score, the more positive his perception of the group along a given dimension.

These values for separate dimensions of a group were then added providing a quantitative estimate of an individual's overall perception of his group. Since a positive response to these questions was assumed to represent a perception of the group consistent with a desire on the part of the subject to maintain the group, we may consider a high total score to represent high adhesion to the group. Viewed at the group level this individual adhesion could just as well be referred to as cohesion and we could speak, thus, of an individual's cohesion score on the questionnaire. We have, then, for every individual member of the group an adhesion or, if you will, a cohesion score; the average of these individual scores being employed as the measure of the cohesion of the group.

We shall later return to the use of these scores from items in the cohesion questionnaire in developing the cohesion test. Before doing so we shall first, however, describe the content of the questionnaire to which values were assigned as above.

### *III. 3. Qualitative content of the original cohesion questionnaire*

As previously stated, it was believed necessary to include many possible facets of the concept cohesion in order to adequately measure it. If these many facets could be shown to form a whole, to hang together, we should presumably have tapped several necessary sources of the total force. Those items from the "cohesion questionnaire" that hang together empirically in this way would then meet our requirements for "cohesion test" items. Our choice of sources to be tapped was guided by the literature and fell generally into two sections; 1) previously employed measures tailored to our sample and, 2) characteristics of cohesive groups as gleaned from prior emperimentation. The cohesion questionnaire can be subdivided for descriptive purposes into four sections. It is of explanatory value to divide the items into the four sections listed below; in the scoring no such divisions were made.

The first section, representing the first item in the questionnaire, is a general measure of how attractive the subject found his group as previously employed

by Schachter (32). One could refer to this question as a global or undifferentiated measure of attraction.
The second section of the questionnaire consists of a checklist of possible reasons for desiring membership in a given group for a particular member. This type of measure was used by Eisman (7) and grows out of the theoretical work of Newcomb (26; pp. 36-42, 264-78). The motives included were specially formulated for our sample, leadership training groups, after several interviews with an industrial sociologist experienced in these particular groups. [2] The subject was left free to choose none, some, or all reasons listed as motivators of his interest or lack thereof in his group.
Section three of the questionnaire consists of measures and adaptations of measures of cohesion employed by Schachter (34; and in 6, p. 152). By the use of these measures we attempt to tap two separate potential sources of cohesion; 1) the resistance to forces toward disruption of the group by members of the group, and 2) personal attraction to a given member of other members of the group, in principle, the type of measure employed in the Westgate study.
A final series of sixteen items constitutes part four of the questionnaire. These questions represent the present author's extraction of some of the characteristics of cohesive groups implied in cohesion research as summarized by Cartwright and Zander (6, pp. 69-94). They measure the individual's perception of his group's possession of these characteristics.
The entire cohesion questionnaire has been subdivided into the above listed sections for our present descriptive purposes only, as a means of showing the theoretical background of its content. In usage, the questionnaire represented 21 questions to be answered according to the subjects' convictions and one checklist requiring a number of yes or no answers. When these questions were scored and assigned quantitative weights as previously described they constituted simply 22 separate scores to be analyzed separately and/or added into one total cohesion score. Sub-scores, representing subjects' answers to any of the above listed four separate types of cohesion measures were never analyzed as such. Only separate items, never separate types of items, were individually analyzed.

### *III. 4. The pilot study sample*

We have described a questionnaire constructed theoretically to measure the cohesion of groups. We have, in the beginning of this chapter indicated that we would require empirical evidence for the validity of this measure. Although any or all of the items in the questionnaire may be assumed to probably represent valid measures of cohesion, we shall stick by our demand that any score based upon the various individual items be shown to validly measure cohesion in our particular sample, and further, that any group of items that do validly measure cohesion also form a whole. Before discussing evidence pertinent to these demands we shall first describe the sample employed in obtaining the necessary data.
The sample employed in the pilot study now under consideration and in the experiment proper, to be described in later chapters, consisted of leadership training groups from various sections of the Staatsmijnen in Limburg. In both studies nine groups were employed, the groups in the experiment proper differing

[2] The author remains in the debt of Mr. J. L'Ortye for his professional aid in this regard.

in subject membership but not in nature from those of the pilot study. Our present discussion of the pilot sample groups can, thus, at the same time serve as a description of the other groups used in the experiment proper.
All groups employed in either study consisted of employees of the Staatsmijnen who met some 30 to 35 times in the course of nine months to be lectured to and to discuss topics relating to the leadership function in their work and in industry as a whole (28). The members of a given group were chosen from separate departments and, thus, as a rule had only passing acquaintance of one another in the beginning of the course.
Each of the separate groups had its own instructor, some of the groups sharing the same instructor. The instructor was a member of the industry's instructional staff and had extensive experience of many of these separate leadership training groups. His task was to arrange the program of topics, introduce them into the group, and stimulate discussions in a non-directive, non-authoritarian manner.
Although there were small differences among the groups employed in our samples as regards topics handled, number of members in the group, scheduling, etc., these groups were quite similar in the beginning of the program in being previously virtually unacquainted employees of the Staatsmijnen faced with a similar task and work method, i.e., to increase their leadership capacities by acquiring human relations skills through the discussion group method.
The reader, by inspecting appendices IV.1. and IV.2. can see that the subjects discussed during the course differed for lower administrative and hourly paid personnel groups. These differences were overshadowed, however, by the essential agreement between the separate programs.
The membership of the groups in question varied from ten in the smallest to sixteen in the largest. While the size of the group probably could influence the development of cohesion in a group, the ratio of the variations in size to the absolute sizes involved in our samples would not seem large enough to cause any considerable worry. In any event, practical considerations forced us to tolerate this variation in size of the groups.
All groups in our sample were at the same stage in the program when measured. The schedule of meetings of the various groups did, however, vary. Some groups had had one subject from the program early in the course, another group had the same subject later in the course. Also, because of temporary work conditions in the various plants, groups sometimes differed in the time periods between sections of the total program. These sources of variation in scheduling between the groups were determined essentially by chance factors and should not have had any differential effect upon the cohesion level of the groups toward the end of the course.
The groups did, however, differ in the beginning of the program in one important respect. Some of the groups in both pilot and experimental samples consisted of hourly paid (foremen) personnel; other groups consisted of lower administrative personnel. In the pilot study sample there was also one additional group of engineers who differed from both of the aforementioned groups, but corresponded more closely to the groups of administrative personnel. The essential importance of this difference between these groups of hourly paid and of lower administrative personnel was that the former groups may be assumed to be more homogeneous in composition. The range in type of work done by foremen group members is quite restricted while there is often a marked divergence among lower administrative personnel in this respect. All foremen came from the line and were charged with the overseeing of production while lower

administrative personnel came from such divergent departments as the drawing room and the accounting office. It is quite likely that range of work interests were more restricted in the foremen groups. With the exception of this dimension of homogeneity of interests of the members of the various groups we can safely consider the groups to be a representative sample from the total population of leadership development trainees from this company. Any additional differences among groups in our sample which existed will be introduced at those points in this paper which facilitate exposition. We may now turn to the pilot study sample as such.

The pilot study sample consisted of 114 subjects divided among nine groups; one academic group, three lower administrative personnel groups, and five foremen groups. In three of the pilot study's groups, those from the S.B.B. or nitrogen fixation plant, the cohesion questionnaire was administered to the group members on four separate occasions: after the fourth, thirteenth, twenty-third, and thirty-third or terminal meeting. In the remaining six groups of the pilot sample the questionnaire was administered once, in an early phase of the group's existence. Data from these administrations of the cohesion questionnaire form the material from the pilot study for analyses performed in the aim of developing an empirically sound cohesion test.

### *III. 5. Factor analysis of cohesion questionnaire data from the pilot study* [3]

We have previously discriminated between "cohesion questionnaire" and "cohesion test"; the former consisting of 22 questionnaire items measuring some dimensions of a group which, in prior studies, were assumed to be cohesion; the latter referring to certain items from said questionnaire which will be shown to form collectively an empirically valid measure of cohesion. It shall be our present task to present empirical evidence to show that some items in the questionnaire do hang together and as a whole do seem to predict to the cohesion of our groups.

Considering that all 22 items in our cohesion questionnaire relate to dimensions of a group which on the basis of prior research have been shown to bear a constant relationship to phenomena collected under the rubric cohesion, it would not seem exaggerated to assume content validity for the items in our questionnaire as measures of cohesion. If content validity be assumed for the questionnaire we might consider all items showing a positive correlation with the total score (sum of item scores) to be the best items for measuring cohesion in our particular sample. If we can demonstrate that certain individual items form a whole, i.e., a factor, we might suspect that this factor would serve as a satisfactory multifaceted measure of cohesion on the grounds of the validity of its content for this purpose. If from the 22 items of the cohesion questionnaire we should be able to sort out those of similar content into separate groups of items we should have increased the factorial purity of the separate groups and be in a better position to state what we are measuring with these separate groups of items. By the use of an independent cohesion criterion we could evaluate the predictive power of any item-group from the questionnaire that we happened to extract in the manner above.

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[3] The author wishes to express his indebtedness to drs. A. H. Boon van Ostade, Personeel Research Afdeling, Staatsmijnen, for his statistical advice throughout the execution of said pilot study.

As reported, the cohesion questionnaire was administered to a pilot sample of nine separate leadership training groups after these groups were in existence for approximately one month. A score from 0-70 was obtained from each of 114 subjects in these various groups for all 22 items of the cohesion questionnaire. These data were then analyzed by the Wherry-Gaylord iterative factor analysis, a technique for isolating item-clusters or sub-tests within the whole (questionnaire) based upon the item-test correlation coefficient (42, 43).[4] By means of this Wherry-Gaylord analysis we hope to separate individual items into more general sub-divisions or item-clusters (factors). In this manner we will be able to provide a more precise specification of what the content of these sub-divisions is, to increase the reliability by the purification of the factorial content of the sub-divisions, and, in a word, provide an empirical multifaceted content valid cohesion measure for further investigation. The following Wherry-Gaylord analysis is intended as a first step in the validation of a cohesion measure by means of which we hope, in essence, to eliminate those items that are measuring something other than cohesion in our sample.

*Factor Loadings of 22 Items of the Cohesion Questionnaire on Two Factors as Extracted by Wherry-Gaylord Factor Analysis*

TABLE III.1

| *Item number* | Factor I | *Factor II* |
|---|---|---|
| 1. | .51 | .29 |
| 2. | .36 | .67 |
| 3. | .72 | .28 |
| 4. | .42 | .37 |
| 5. | .70 | .25 |
| 6. | .58 | .20 |
| 7. | .46 | .09 |
| 8. | .61 | .29 |
| 9. | .61 | .29 |
| 10. | .61 | .20 |
| 11. | .58 | .20 |
| 12. | .33 | .57 |
| 13. | .54 | .23 |
| 14. | .58 | .38 |
| 15. | .34 | .47 |
| 16. | .42 | –.01 |
| 17. | –.14 | .14 |
| 18. | .33 | .57 |
| 19. | .46 | .23 |
| 20. | .61 | .33 |
| 21. | .67 | .28 |
| 22. | .55 | .29 |

[4] Following Wherry and Winer (43), it can be shown that this technique is a special case of the multiple group centroid method of factoring (45). In working toward increased reliability, the items sorted into particular sub-groups will have increased similarity of factor content, (page 36)

Table III.1 consists of two separate columns or r point-biserial correlations, [5] i.e., the correlation coefficient concerned with predicting how much a dichotomized item contributes to a total score. [6] In the interest of space and continuity of presentation we will give no detailed description of the mechanics of the Wherry-Gaylord analysis (See: 5, 44).

It should be sufficient for our purposes to say that the point-biserial correlations in Table III.1 represent the factor loading of the cohesion questionnaire items on two separate factors extracted from our data. Whenever a given item has a significant loading in a given factor it belongs to a sub-group (item-cluster) consisting of items with like loadings in that factor. The significance of a given item's loading in a given factor can be tested by the chi-square test in Wherry-Gaylord analysis. For the purposes at hand, i.e., the selection of items to constitute independent subgroups of items, a rigorous significance level of .001 was chosen. Any item with a point bi-serial correlation coefficient of at least .37 in Table III.1 indicates that that item belongs to the factor (item-cluster) in which it so correlates. A correlation of less than .37 on a given factor for a given item indicates that the item does not belong to that given factor.

It can be seen from this table that the items are broken up into three groups or clusters of items of similar factorial content, hereafter referred to for convenience' sake as Factors I, II, and III, bearing in mind that they need not represent univocal factors. Thus, Factor I consists of cohesion questionnaire items: 1,3-11, 13, 14, 16, 19-22; Factor II of items: 2, 12, 15, 18, and Factor III or item 17 which is part of neither item-cluster I or II. The only situation which is not totally unambiguous is with regard to items 4 and 14 which have significant loadings in both Factors I and II. Since both items have higher loadings in Factor I they were assigned to said factor. Having, thus, quantitatively broken down the 22 items of the cohesion questionnaire into three separate subgroups of items (item-clusters or factors) we will proceed to an identification of the factors by means of detailed analysis of the content of their respective items.

### *III. 6 Qualitative analysis of the item-clusters (factors) extracted from the original cohesion questionnaire*

Factor I may, for descriptive analytic purposes, be labeled "identification with group" and is characterized by a desire to retain membership in a group (items 3 & 5) which is perceived as successful (item 21) and striving toward a worthwhile (item 22) and mutually agreed upon goal (items 8 & 11); a feeling of

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but this communality may be a combination of common factors. Factorially univocal tests necessarily result only if one factor predominates a test from the start (13, p434). Recent research indicates that the largest factor extracted from a Wherry-Gaylord analysis is identical to the largest factor extracted from the centroid analysis performed upon the same material. The practical difference between the Wherry-Gaylord and the centroid seems to be that the latter method yields more precise secondary factors, i.e., that any smaller factors found in a Wherry-Gaylord analysis must be suspect of being further differentiated if the more powerful centroid analysis be employed (5). The method should, however, obtain the goal of reliability and relatively independent scores (13, p434).

[5] The point-biserial coefficients were calculated from phi correlations obtained in the course of Wherry-Gaylord analysis.

[6] Data used in performing the Wherry-Gaylord analysis are not presented in the appendices. We will only present the summarization of these data which appears in the body of this chapter. The extensive nature of these data employed in the Wherry-Gaylord analysis precludes their inclusion in the appendices which are already extensive as a result of other data.

teamwork (items 7 & 16) and willingness to accept work in the group's behalf (item 9) as well as defending it before outsiders (item 10). These sentiments could, in short, be described as a unity or closeness of the members' perceptions with regard to their particular group in relation to a concrete goal. By describing this factor as "identification with group" we refer to the sentiment of unity of the member with his group which could be inferred for a subject scoring these items positively.
While we can be reasonably confident of having adequately described the qualitative nature of Factor I we must be somewhat more skeptical of interpretations of Factor II. We must bear in mind that these four items in Factor II might, in fact, have been broken down into several independent factors had we employed centroid method. We shall hazard the guess that the content of the second factor could be described adequately under the rubric "desire for interpersonal contact" for its own sake and as an educational medium. This position seems defensible in that one of the principal components of the second factor, namely, item 2, when in turn broken down into its parts, was principally determined by its sub-items 1-4, 11, 12 and 18. The content of these sub-items of item 2 may be interpreted to support our nominal definition of Factor II. A second, and contributory, source of evidence for our labeling of Factor II is the content of a second of its components, namely, item 12. The two other components of Factor II, item 15 relating to the willingness to employ sanctions and item 18, or status, may very well represent independent specific factors that would have been obtained by centroid analysis. This question can not really be answered satisfactorily with our data. Whether this be the case or not, it is clear that these four components of Factor II do not fall under Factor I.

Factor III, that is item 17, could not be identified, the only possible judgment as regards this item being to the effect that it is independent of either Factor I or II.

It has been the objective of this Wherry-Gaylord analysis to sub-divide our content valid cohesion questionnaire into sub-divisions of similar content. Having done this on a quantitative basis and, further, having qualitatively described the content of these sub-divisions it is our present task to choose one of these three sub-divisions as our test of cohesion. It would appear that Factor I items meet our requirements for a unified multifaceted measure of cohesion in this sample. Our discussion of the content of this item-cluster has, we hope, brought a certain structure into the meaning of our concept of cohesion.

### *III. 7. Statistical independence of the extracted item-clusters*

If item-cluster (factor) I is to meet our original demands of a cohesion test we shall have to demonstrate that it is reliable and valid. Before taking up this problem we will wish to know one last bit of information, namely, to what degree the three factors are independent of one another. When Pearson correlations are calculated between the 114 subjects sub-total scores on the respective items from the three factors the resulting correlations are as appears in Table III.2. [7]

[7] Raw data not included in Appendices.

*Pearson Correlations for the Degree of Interrelationship between Factors I, II, and III as Ascertained from 114 Individual Scores from the Pilot Sample*

TABLE III.2

| | |
|---|---|
| Factors I & II | .56 |
| I & III | –.07 |
| II & III | –.11 |

Though the correlation between Factors I and II is positive and large it must be remembered that the variance shared in common between these two measures is only .31, i.e., correlations when used for this purpose only begin to be significant at about .70 where the shared variance approaches .50. A shared variance of .31 would seem to meet the "relatively independent" category mentioned by Guilford as a resultant of the iterative method of item selection (13, p. 434). We shall discuss in section III.10. the relative predictive power of the two item clusters I and II during our demonstration of the validity of item cluster I.
Table III.2 indicates clearly that Factor III (item 17) is measuring something other than what is being measured by the other factors.

*III. 8. Problems of reliability and weighting* [8]

In previous analyses we have been dealing for the most part with items scored and analysed individually. We will, of course, wish to combine scores of the seventeen items in item-cluster I and must therefore first deal with questions of the possible assignment of weights to the individual items in the cluster before dealing directly with the statistical questions of reliability and validity. Following Guilford (13, p. 447), when a test shows, 1) high reliability, 2) high item-inter-correlation, and 3) has at least 10-20 items, the weighting procedure is unwarranted. Since this is the case as regards the seventeen items in item-cluster I it was decided to avoid weighting the seventeen items differentially. These seventeen items, each assuming a value of 0-70 as described, will be added together yielding a total adhesion (cohesion) score for a given individual between 0-1190. In order to calculate the cohesion score for a given group an average will be taken of the individual scores of the group's members.
To be empirically acceptable a measure of cohesion must be both reliable and valid. One of our principal criticisms of previous oneshot measures of cohesion was to the effect that they should of necessity prove statistically unreliable. How reliable is Factor I above as a measure of group cohesion? On the basis of the pilot study data reliability, when ascertained in terms of Tryon's (40) internal consistency measure and corrected for administration in groups of at least ten subjects (27), is .989. This is clearly acceptable. As we will later concern ourselves with the predictive efficiency of Factor II as compared to Factor I we might mention here in passing that its reliability is also a respectable .93. It is necessary to know the reliability of Factor II even though we are not principally concerned with this factor in order to meaningfully discuss its predictive power later in this chapter. Were it not reliable it could obviously not be valid.

[8] Raw data used in calculating reliability coefficients are excluded from appendices.

### *III. 9. A cohesion criterion* [9]

In order to validate our proposed measure of cohesion an independent measure or estimate of the cohesion of the groups in our sample was required. This proved possible with regard to three of our nine groups in the pilot sample, i.e., those three of the total nine pilot study groups in which we were able to obtain more than one measurement in time of the cohesion of the groups. Because these three groups all came from a single plant in the Staatsmijnen they were all under the general direction of the same two members of the industrial training staff. These staff members had, thus, not only intimate experience of these three groups through their function in them of non-directive leaders but one of the two experts had an additional ten years' experience in this type of group. This senior staff member and his assistant served us as a source of expert opinion as regards these three groups.

It was, from the point of view of this study, the fortunate occurrence that one of these three groups tended, in the opinion of the experts, to sharply differentiate itself not only from the other two groups in our sub-sample but additionally from the majority of similar groups in the experts' prior experiences (29). This particular group, to employ everyday terminology, seemed from the start to jell as a group. Spirited discussions sprang up with regard to the majority of topics and the members in various ways demonstrated apparently genuine interest in their group's activities. In the staff members' opinions, this group could easily be classified as distinctly more cohesive than their other two in the global, undifferentiated meaning of cohesiveness as "stick-togetherness", "we-ness", "pulling-togetherness' and similar loose terminology. While it is freely admitted that such a criterion of cohesiveness leaves much to be desired in the quantitative sense it should be stressed that for staff personnel with extensive experience in groups this sort of ordinal scale judgement is not difficult to make accurately. It should be kept in mind that our purpose is essentially to establish the agreement or lack thereof of a precise quantitative instrument (the proposed cohesion measure, Factor I) with an expert's everyday general conception of "groupness", "stick-togetherness", and the like. With this purpose in view, the author is inclined to view this criterion as among the strongest possible in similar practical circumstances. We have been able, thus, to compare responses to the total cohesion questionnaire of two groups differing in cohesiveness as rated by experts; 1) a cohesive group hereafter referred to as the experimental group, and 2) two other less cohesive groups combined to form a control group.

### *III. 10. A comparison of item-clusters I and II as predictors of the growth of cohesion in time*

If the experimental group described above is indeed a cohesive group we might expect the cohesion to grow in time. We would assume that in the beginning of the group's existence a certain potential for cohesion would exist but that the group's members would require the opportunity for mutual interaction before we could speak of cohesiveness.

Although increase of cohesion in time need not be linear we would, on the basis of cohesion theory, expect cohesion to increase in time in those groups that

[9] The author remains indebted to Dr. J. J. M. Penders and Mr. H. H. Nijhuis of the leadership development staff of the nitrogen fixation plant of the Staatsmijnen for their invaluable service to him in the evaluation of several groups under their supervision.

succeed in maintaining themselves as groups until it reaches a certain maximum. If Factor I from the cohesion questionnaire is a measure of cohesion then scores on it should significantly increase in time for the experimental group. This should not be true of Factor II scores if, as we have assumed, the items in this item-cluster are not as good as Factor I items in the measurement of cohesion.

Measures of the experimental and control group members were made by means of the cohesion questionnaire after the fourth, thirteenth, twenty-third, and thirty-third or final meeting of the groups. Data from this total questionnaire were then split up to yield separate mean scores for both item-cluster (factor) I and item-cluster (factor) II. In the experimental group the F-ratio among the group means on the cohesion questionnaire scored for Factor II for these four time periods was, as expected, insignificant, i.e., we may not assume that mean Factor II scores increased with time. [10] If we, however, perform the same analysis on the four Factor I means in this experimental group the F-ratio of 2.85 is significant at the .05 level of confidence.

On the basis of the analysis of variance test reported above, we may proceed to a more detailed analysis of these Factor I means in the experimental group by means of the Student t-test. Table III.3. shows the four means on Factor I for the experimental group. [11]

*Mean Cohesion Scores for Four Time Periods in the Experimental Group's Existence*

TABLE III.3

| *Measurement* | *Mean of Factor I* |
|---|---|
| 4th week | 806 |
| 13th | 899 |
| 23rd | 966 |
| 33rd | 901 |

Analysis by means of Student's matched-small sample t-test reveals that Factor I means in the experimental group were higher on the second, third, and final administrations of the questionnaire than on the initial administration at the (.01), (.01), and (.05) confidence levels respectively. The mean score on the third administration is also higher than on the second (.05). Means on the second and third administrations do not differ from the fourth, in fact the final measurement is insignificantly lower than the third. In summary, in the experimental group mean scores for Factor I items increased in time from week 4 until week 23 and then remained at that level over the final quarter of the group's existence. [12] Similar increase does not occur as regards Factor II item's mean scores. The increase in time in mean scores for Factor I items of the questionnaire is clearly what would be expected if these items constituted a valid measure of cohesion and one assumed that cohesion grew in time in the groups. If we are justified in assuming on the grounds of the content of the items in Factor I that they relate to the cohesion phenomenon and if we assume that this cohesion grew in time in our cohesive group (the experimental group) then the increased mean score on these items would appear most economically explained on the grounds of a validly

[10] Cohesion questionnaire Factor II scores are not included in the appendices in the interest of space.

[11] Appendix II.1.

[12] Two-tailed tests.

measured increase in cohesion. This evidence serves as support for the validity of our proposed measuring instrument Factor I.

*III. 11. Item-cluster I's ability to differentially predict the cohesion of groups*

Having demonstrated that mean Factor I item scores on the questionnaire increased significantly in time in a cohesive group, i.e., that there was a significant absolute rise in scores on Factor I, we could make the evidence for the validity of this measure more convincing by showing a relatively steeper rise in the experimental group as opposed to the previously mentioned control group. If we compare the means of our experimental group with those of the control group we should expect the former to be significantly higher at all times excepting on the initial measurement. Table III.4 shows the means on Factor I items for experimental and control groups at four time periods. [13]

*Mean Cohesion Scores for Experimental and Control Groups at Four Time Periods in the Groups' Existence.*

TABLE III.4.

| | *Fourth Week* | *Thirteenth* | *Twenty-third* | *Thirty-third* |
|---|---|---|---|---|
| Experimental | 806 | 899 | 966 | 901 |
| Control | 777 | 802 | 724 | 772 |

Student "t" analysis reveals the groups to be initially equal ($t = .54$) as regards Factor I scores. When remeasured during the thirteenth week the experimental group was significantly (.05) higher than the control group. This was also true for the twenty-third (.0005) and thirty-third or final (.005) measurement. [14] It may be concluded that Factor I items of the cohesion questionnaire adequately predicted to the practical criterion of cohesion.

*III. 12. Homogeneity of the groups' membership and scores on item-cluster I*

A final source of evidence may be presented with regard to the validity of Factor I item from the cohesion questionnaire as a test of cohesion. If one assumes that the greater the homogeneity of a group, the higher the cohesion (10), then those groups in our pilot sample having a heterogeneous membership should score lower on Factor I than groups having a more homogeneous membership. As already mentioned, the five administrative personnel groups in our study should form a more heterogeneous sample than would the foremen groups. One would, then, expect a significant negative correlation between administrative personnel groups and item-cluster I. This correlation is indeed –.49, significant beyond .001. [15] This criterion, although admittedly rough, does dovetail with the previous findings.

[13] Appendix II.
[14] One-tailed tests are appropriate in this case.
[15] Data not included in appendices.

*III. 13. Summary*

In order to develop a test of cohesion a 22 item questionnaire was formulated on the basis of the literature. This instrument was believed to tap many potential facets or sources of the force cohesion. In order to bring more structure into the resulting measure of cohesion it was decided to break this questionnaire down quantitatively into those items that belonged together, i.e., that were measuring the same entity. Having done this we should then have been able to state more specifically what the exact qualitative content of our cohesion measure was. As a result of data collected in a pilot study the whole questionnaire was broken down by means of a Wherry-Gaylord item factor analysis into three item-clusters or factors which were in turn qualitatively analyzed. The largest of these item-clusters, Factor I, consisting of seventeen of the original 22 items, appeared to be the best measure of cohesion on the basis of its content. On the basis of further analyses done in three of our nine sample groups in which we were able to obtain measure at various stages of the groups' duration, we were able to present quantitative evidence that the items in Factor I, considered collectively, formed a reliable total score measure of cohesion and validly predicted to an independent criterion. It was decided to employ the seventeen items from the original questionnaire that formed Factor I as the measure of cohesion in future investigations. The remaining four items from Factor II and the single item constituting Factor III will, henceforth, be dropped from further consideration as measures of cohesion. Only Factor I items will be employed as the "test of cohesion". An individual group member's score on these seventeen items (0-1190) will serve as his adhesion score. An average of these adhesion scores for all individuals in a group will serve, henceforth, as the measure of that group's cohesion.

# CHAPTER IV / AN EXPERIMENTAL METHOD FOR INVESTIGATING COHESIVE GROUP PHENOMENA

## *IV. 1. Introduction*

We have stressed in Chapter II the necessity of developing a multifaceted empirically validated measure of group cohesion. Armed with such an instrument, Factor I items from the cohesion questionnaire as described in Chapter III, we may proceed to test our theoretical assumptions concerning cohesive groups. By means of measurements performed in specified groups of leadership trainees we were able to test experimentally the above mentioned hypotheses. The question of how these measurements were developed and employed, i.e., the nature of our data, will be dealt with below. We can begin our discussion of the experiment proper by discussing the sample employed.

## *IV. 2. The experimental sample*

In our discussion of the pilot study sample we observed that said discussion applied essentially to the present or experimental sample also. This was, indeed, the case as regards the qualitative nature of the experimental sample. All subjects upon whom measurements were made in this study were employees of the Staatsmijnen in leadership training groups just as in the pilot study sample. There were 117 of such subjects divided among nine groups, five were composed of members with white-collar, non-professional job backgrounds, the remaining four of members with foremen assignments in the industry.

Probably the only essential difference between this experimental sample and the pilot sample is as regards the time at which cohesion measurements were taken in the two samples. As described in the pilot sample measurements of cohesion were, with the exception of three groups from the nitrogen fixation plant, taken at the end of approximately one-fourth of the group's existence, i.e., relatively early in their "life" as a group. In the experimental sample, however, these measurements of cohesion were taken at the very end of the group's existence, just before these groups were to be terminated. It may safely be assumed that the subjects in the experimental sample had more knowledge of their fellow members, the group's program, its successes and failures, and the like, than did subjects from the pilot sample, excepting, of course, twenty-third and thirty-third session measurements from nitrogen fixation plant groups. We might expect those factors determining either an increase or decrease in cohesion to be more clearly operative in the experimental sample's groups.

In all essentials, however, these groups from the experimental sample are so similar to the pilot study sample that we may consider the cohesion test developed in the pilot study to be a tailor made test of cohesion for the experimental sample.

## *IV. 3. The Collection of data* [1]

A detailed description of the material used to collect data will be given as we repeat the hypotheses one by one. It should, however, be of benefit to the presentation if we first sketch in the measurement situation and its background without reference to specifics.

Before any measurements were performed the experimenter or delegate of the experimenter first availed himself of the opportunity to speak to the prospective subjects in their respective groups. The experimenter was introduced to the various groups as a university student temporarily in the employ of the Staatsmijnen who desired to collect data for an academic manuscript. It was stressed that the Staatsmijnen had no direct stake in the proposed investigation other than to aid the experimenter in the execution of his study. This emphasis upon the experimenter's independence of the Staatsmijnen was believed necessary to reduce any anxiety in the subjects that data should be used by the personnel department for supervisory purposes. After said introduction the experimenter or his representative explained in general terms that he was interested in some aspects of how groups work. When this obviously unclear statement of aims met with specific questions the groups were informed that for purposes of experiment detailed explanations were impossible until such time that the data were collected. They were assured that: 1) we were not interested in individual personalities in the group, 2) no employee of the Staatsmijnen should see any data identified by the name of the subject involved, and 3) they should be thoroughly informed of our aims and the results of the investigation at our earliest possible opportunity. It was believed necessary to stress the fact that their participation should be thoroughly voluntary in as much as our data collection procedures employed the use of the names of members of the group. In this regard any group having any member who indicated that he would "rather not" participate was excluded from the investigation. [2] Group members were encouraged to discuss the question among themselves in the absence of both the experimenter and the instructional staff and were to report their decision by means of a designated group member. In short, the groups were given every possible opportunity not to co-operate. All of the groups contacted did vote to co-operate and we do not have the least hesitancy in describing their co-operation as voluntary. This impression was fortified by the extremely co-operative behavior of all 117 subjects in our groups in the face of a relatively long and rather personal experimental task. All evidence from the testing situation and certain trends in the data indicate that the subjects co-operated to the utmost of their ability.

After voluntary recruitment of the groups was accomplished appointments were made with individual subjects for testing. Data for each subject were obtained individually, often in the room with a fellow group member, under the direction of the experimenter or his assistant. [3]

These individual sessions lasted an average of 40 minutes for each individual during which time all necessary data for the individual in question were collected.

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1 The entire experiment was conducted in the Dutch language.

2 There was one exception to this rule. One subject, a member of Group III professed himself thoroughly unable to execute the sociometric task when presented it during testing. This subject's other data as well as data pertaining to him from fellow subjects in Group III were dropped from analyses.

3 Sincerest thanks are expressed to Mr. W. Knops who collected fully half of the raw data in this experimental program.

An attempt was made to test all members of the same group on the same day or on two consecutive days, although this was not always possible. The experiment began on May 27th and the last subject was tested on July 19, 1963. Between these dates all data for this experiment were collected by individual measurements as described below.

### *IV. 4. The measurement of the independent variable cohesion and/or adhesion*

We have seen in Chapter III that the seventeen items from the cohesion questionnaire constituting Factor I met our requirement for a "test" of cohesion. These items provide the basis for our measurement of cohesion in the experiment proper.

Each of our 117 subjects first filled in the entire cohesion questionnaire with its 22 items. The entire questionnaire was employed in an attempt to keep measurement conditions in the experimental sample equal to those in the validating pilot study, i.e., the entire questionnaire was administered to the subjects in connection with the problem of statistical reliability. The entire questionnaire was not scored; only those seventeen items forming Factor I were scored and the remaining five items were ignored in the scoring. The basic cohesion score constituted, thus, an individual's score on only those items of Factor I.

In answering these seventeen items the individual placed a mark on a scale indicating his answer to the separate questions. These separate answers could then be scored 0-70 and their total could vary between 0-1190 as previously described. In accordance with the construction of the questions the higher the score, the higher the level of cohesion indicated.

We have, as indicated, adopted for purposes of presentation the policy of referring to individual "adhesion" and group "cohesion". This distinction is meant to serve the pragmatic purposes of exposition; we do not wish to imply that group cohesion is something above and beyond a representation of what is measured at the individual level (24). With this intention in mind our data as regards cohesion consist essentially of 117 adhesion scores for members of the nine groups. These scores can range between 0-1190. The cohesion of the various groups is some average of the adhesion scores of its members as will be seen in the following chapter. When we say that one group is more cohesive than another we mean that the average cohesion test score of its members is higher.

As regards the measurement of cohesion we have, thus, individual adhesion scores obtained from the scoring and summing of all Factor I items on the questionnaire and group cohesion scores, i.e., some average of individual adhesion scores for a group's members.

### *IV. 5. The measurement of the dependent variables*

While cohesion always serves as the independent variable in our investigation we have several dependent variables. In illustrating the measurement of these dependent variables we will first repeat the hypotheses from Chapter II to which particular measurements are relevant and then describe the relevant measure itself.

*IV. 6. Measurement of agreement as to reasons for membership in the group*[4]

There are, of course, innumerable reasons for desiring membership in a group. We have already discussed several. In our attempts to develop a measure of cohesion we made use in one item of 26 possible reasons for desiring membership in a group. The reasons represented many different sources of potential attraction to a group.

As a result of analyses presented in Chapter III we have seen that this type of measure in the form of our particular checklist and for this sample did not appear as good a measure of group cohesion as many of our other alternatives. It should be pointed out that this type of measure relative to other measures was an unsuccessful measure of cohesion when scored in the manner described previously, i.e., the total number of reasons indicated by the subjects to have represented reasons for their having wanted to be members of their group. It was, therefore, in the form of item two, henceforth, dropped from the test of cohesion. This does not, of course, indicate that group cohesion and the subjects' common evaluations of particular reasons for group membership need be unrelated. The manner in which the measure in question was employed in the pilot study could have determined the negative results. On this assumption certain changes were made in the utilization of the original checklist and the new measure of reasons for group membership was then employed to measure a variable assumed to be related to group cohesion. Before discussing the changes introduced into the new measure the reader should first notice that the checklist no longer has anything to do with the determination of the level of cohesion in the experimental sample. It can, as already mentioned, obviously not be employed in the same experiment as measure of the dependent and independent variables.

Extensive changes have been made in the use of the checklist as a measure. In the first place, as measure of the dependent variable we employed only ten of the original 26 questions. These ten were chosen on the grounds that they were the most popular of the reasons in the pilot study, i.e., the ten reasons that apparently were valid reasons for our study's subjects to want to belong to their groups. The second change introduced into the use of part of the pilot study checklist is probably the more crucial. It was reasoned that the consensus as to the hierarchy of importance of these reasons would represent a more meaningful measure of agreement among subjects than would a sum of yes or no reactions toward them. Our measure of the amount of agreement among the members of a given group as regards their reasons for wanting to belong to the group became, thus, a measure of the agreement among them as to the rank order of importance of said reasons to them. Each subject individually was asked to rank order the ten reasons as to their respective importance to him personally as reasons for belonging to his group. The agreement among individual rankings within a given group constitutes our measure of this dependent variable. By use of this measure we concern ourselves with a detailed form of agreement (hierarchical structured values) and not principally with rejection phenomena as was done in previous studies.

A final point to be made in regard to this measure concerns the experimental controls involved in its usage. The order of occurrence of the specific reasons on lists presented our subjects was systematically counterbalanced. One should not expect any possible positional effects to systematically influence the subjects' individual rank orderings.

[4] Appendix III.

*IV. 7. Measurement of agreement among group members as regards the group's tasks* [5]

As leadership training groups our sample's groups were assigned a number of topics for discussion that could best be described as a human relations program (See: 28, pp. 171-72). These topics varied in the amount of personal participation required from the group members. Some required active participation from the members in the give-and-take of group discussion of certain human relations cases. Other topics required only that the subjects passively listen to heads of various industrial divisions discuss their department's operation, e.g., the industrial physician. For the individual member the meaningfulness to him of the time he spent in these training groups was greatly determined by his perception of the value of these topics. Because of the importance of these topics to the group atmosphere, opinions regarding them tended to polarize. When there was mutual agreement as to the value of a given subject to the group, co-operation among members tended to increase and a satisfactory discussion atmosphere prevailed. In its absence dissension with regard to how much time to spend upon a given topic split the group's members. In translating into a satisfactory measure our assumption that agreement among members as regards the common task should characterize the cohesive group, we have made use of the invaluable aid of the industrial instructional staff. On the advice of these staff members we have chosen from around twenty topics presented the group those twelve of presumably greatest interest to the group's members. The subject was asked to rank order these topics in accordance with his opinion of their importance to him. The agreement among individual rank orderings indicated the agreement in the group as a whole. We believe the degree of agreement among members with regard to the hierarchy of importance of these topics to be a superior measure to any all-or-none, important-unimportant, alternative type measure.

These rank orderings were obtained from six of our nine groups. Similar measures could not be obtained from the remaining three groups because topics presented in these groups were not sufficiently distinguished from one another to ask the members to rank order them. The program in these three groups, while essentially the same human relations type course, consisted almost entirely of group discussion of a quite general nature. For this reason, a section of our entire sample is excluded from analyses concerning agreement as to the relative importance of group tasks.

The same randomization controls were employed with these lists of topics as were employed with the lists of reasons for group membership.

*IV. 8. Communication measures* [6]

We depart, at this time, from the order of presentation of hypotheses in Chapter II in order to deal with the measurement of communication before tackling the sociometric measure which yielded data for seven of our hypotheses.

Our measure of the amount of communication in a given group consists of a series of scales the amount indicated upon which represents for a given member of the group his impression of the degree to which fellow group members communicated to him during the group's lifespan. Each member of a group received a

[5] Appendix IV.
[6] Appendix V.

list of names of all of his fellow group members. Beside each name was a scale of 70 millimeters length identical in type to the cohesion item scales. The farther toward the left hand side of such a scale that a subject placed his mark, the greater in his opinion was the degree of communication received by him from the fellow subject to whom the scale referred. A dotted line in the middle of each scale was explained to the subject as indicating average communication from its referent, i.e., "about what you might expect from someone in the amount of time that you have been with him in this group." The subjects were at all times free to place marks for all fellow members at any point on the scales desired. By means of measuring the distance of a given subject's mark on a scale from the right hand side of the scale it was possible to assign a score of 0-70 for his perception of how often the scale's referent had communicated to him during the course of the group's existence. These scores made it possible to assign a quantitative value to: 1) total communication in a group, i.e., the sum of all scales filled in by all members of the group and, 2) the total amount of communication received by a given member, i.e., the sum of scales for his colleagues as filled in by him, and finally, 3) the amount of communication received from particular others, i.e., any given individual scale filled in by the subject. These data for all subjects in all nine groups constitute the material for testing our hypotheses regarding communication in cohesive groups.

It should be noted that this measure of communication is subjective in nature, i.e., we have asked the subject to estimate to what degree others in his group communicated to him. We do not feel that this measure is inherently inferior to an objective measure, e.g., the Bales observational system (3), because the importance of communication is its effect upon the subject, not its objective frequency. The psychological effect of communication "units" upon a subject can not be directly estimated. The importance of the fact that a subject was of the opinion that many spoke often to him or its opposite is as relevant to our purposes as any recording of "units" of communication. The principal weakness in our measuring technique is its undifferentiated nature. We have no way of specifying the content of what was communicated. We shall, therefore, have to content ourselves with questions concerning the perceived (on the part of the subject) communication in groups of various degrees of cohesiveness.

The order of presentation of subjects' names appearing on the lists to be filled in by the subjects were systematically varied from list to list to allow for the cancellation of any constant errors which might have been present.

### *IV. 9. The general sociometric measure* [7]

The data for the testing of our various hypotheses concerning the nature of interpersonal relations and the subjects' agreement as to and structure of the group as a whole were obtained from a sociometric technique administered the subjects. Each subject was presented a pile of cards, on each card appeared the name of two members of the subject's group. In total there were $\frac{1}{2}n\,(n-1)$, ($n =$ number of subjects), cards or pairs of names. The name of every member of the group (the subjects' own names included) in combination with every other

[7] The author remains in the debt of Dr. G. Koene, director of personnel research, Staatsmijnen, for his many valuable suggestions, among others being that of the application of a forced distribution measurement model to the sociometric measurement problem in this section of the investigation.

member of the same group appeared once in the pile of cards. The subject was then asked to proceed through the deck of cards dividing the cards among five categories. These categories, indicated for the subject by a sheet of paper upon which he was to lay the card, were: Category A, those x cards upon which appear the combinations of names of members of the group who could work best with each other; Category B, those x cards indicating the pairs of subjects who could work well together but not so well as the combinations in Category A; Category C, those x cards indicating the pairs of subjects who could work about averagely with each other; Category D, those cards indicating the pairs who were a little below the group's average in ability to work together; and finally, Category E, those members who could work least well with each other. The number of cards or name-combinations that the subject had to place in each category was determined in advance by the instructions and so arranged as to provide a forced normal distribution in a manner similar to the Q-sort (38). The exact number of cards in each category varied with the size of the group but closely approximated the following per cents in all nine groups: Categories A and E, 6.7; Categories B and D, 24.2; and Category C, 38.2. The subject was always informed that the meaning of the various categories was in ordinal, not absolute, terms. Thus, Category A combinations were always better than Category B's; both could, however, indicate poor teamwork; Category E was poorer than D; both could indicate good teamwork. The subject was asked to give a relative judgment and in no sense an absolute one over his colleagues. The subject could take as much time as he liked (most used about 25 minutes), change cards from one pile to another, i.e., one category to another, and in general attack his problem however he liked as long as he arrived at the required distribution. At such time as the subject was finished the experimenter noted his assignment of name-combinations to one of the several categories. The combinations placed in Category A were arbitrarily scored *5*; those in B were scored *4*; etc., . . . until finally Category E combinations were scored with a *1*. A high score indicated good teamwork between a pair of group members, a low score poorer teamwork. Every subject in all nine groups performed this sociometric task, in effect evaluating all pairs of members in their groups on the dimension of ability to work together. From these basic scores all analyses of structure and agreement among the subjects as to structure were performed. We shall deal briefly with the different uses made of these scores, the subject being handled extensively in the following chapter.

In a manner similar to that described in immediately preceding sections, constant errors were randomized by a counterbalanced order of presentation of the name-combinations.

### *IV. 10. Measurement of mutuality of evaluation in interpersonal dyads*

Every member of each group had to evaluate n-1 cards with his own name in combination with all other members of the group. The value assigned by a member to these cards represented his estimate of how well he could work together with the respective partners. A product-moment correlation coefficient between the values assigned all combinations in the group of the sort A-B, A-C, etc., as rated by A and B, A and C, etc., states the level of mutuality of evaluation in the group.

*IV. 11. Measurement of cholce behavior of adhesive subjects*

We have hypothesized that mutual choice should be highest between fellow "more adhesive" subjects: We have defined "more adhesive" subject operationally as the top quartile (or closest approximation thereto) of the group's members on the cohesion test, e.g., in Group I with sixteen members, the four highest members are referred to as "more adhesive"; the lowest four as "less adhesive" subjects; in Group IX with ten members, the top two are "more adhesive", the lowest two, "less adhesive". Our hypothesis is to the effect that more adhesive subjects will highly evaluate more and lowly evaluate fewer of their fellow more adhesive subjects than they will with regard to less adhesive subjects. "High evaluation" we define as a value of *4* or *5* assigned to a fellow group member as a partner; "low evaluation" is like assignment of a score of *1* or *2*.

*IV. 12. Measurement of agreement in the group as to fellow members' status in the group*

Every member of each group has evaluated not only his relationship to all other members of the group but also the relationship of all other members of the group to each other as he sees it. He has in this manner assigned a status in the group to himself and all other members of the group. We refer here to "status" in the usual sociometric significance of the term, i.e., a choice status among one's colleagues. A subject's status, self-assigned, is the sum of values assigned by him to all combinations of his own name and others. His evaluation of another member of the group, let us say member "B", is in like manner the sum of values assigned by him to all combinations of "B" with other group members. Let us for the sake of illustration assume that there was no restriction in the number of *5*'s, *4*'s, etc., that a subject could assign his colleagues (as in fact there is in our study). In this case if there were ten members of a given group the status assigned "B" by "A" would have to vary between *45* (nine cards each with an optimal value of *5*) and *9*. This could not occur in our data because of the limited number of *5*'s which "A" could assign others in the group but it should serve as an oversimplified example of the calculation of a status score. In this manner each member of a group assigned a status to every fellow member. These assigned status scores, i.e., evaluations of group members on their relative abilities to work with fellow group members, can be rank ordered for each subject indicating his estimate of how the group is structured hierarchically. A comparison of similar rank orderings from all members of a group indicates the agreement among the group's members regarding inter-relationships within the group.
The reader will notice that this type of agreement among members as to how their group is organized is qualitatively entirely different from prior measures of "agreement as to" or "uniform perception of" deviates.

*IV. 13. Measurement of members' accuracy in predicting their own positions in the group*

As already indicated each subject assigned himself a status in the group, namely, the sum of values assigned by him to all dyadic combinations of group members one of which was himself. Each subject is in turn assigned a status by the group as a whole, i.e., the sum of values assigned all cards bearing the subject's name by others in the group. Discrepancies between these values reflect the degree of

accuracy of a subject in assigning himself to a position in the group. An average of such discrepancies for the members of a given group represents the group's accuracy in making these judgments relative to the accuracy of another group.

### *IV. 14. Measurement of the rates of rejection and/or high-evaluation in the whole group*

We can measure the per cent of rejection in the group by operationally defining a rejection as the assignment of the score of *1* to an interpersonal evaluation. By "interpersonal evaluation" (or relationship) we mean one in which the rater is involved as one of the evaluated partners, e.g., combination A-B as evaluated by either A or B. Although the per cent of *1*'s in any group as a whole is artificially held equal to that per cent in all other groups, to wit, 6.7 per cent of all evaluations, the manner of assigning these *1* scores varies. Member "A" can assign the interpersonal relationship A-B the score of *1*; we call this a rejection of "B" by "A". On the other hand, member "A" can assign the "non-interpersonal" relationship C-D the same score of *1*; we do not refer to the latter as a rejection. Rejection refers to personal rejection of another member of the group. Although the per cent of *1*'s that members in all groups must assign is equal, of necessity, for all groups; the per cent assigned to interpersonal as opposed to non-interpersonal dyadic pairs is free to vary. We will refer to the per cent of possible *1*'s assigned to interpersonal pairs as the rate of rejection.
This same logic may be applied to high evaluations operationally defined as the assignment of *5*'s to interpersonal pairs in like manner as above. We employ these two measures to measure the rate of high acceptance as well as its opposite rejection in the group and will relate these ratios to the cohesion level of the group.

### *IV. 15. Measurement of the centrality of group structure*

Centrality of structure refers, of course, to the concentration or dispersion of choice in the group. A group characterized by a concentration of choice in certain parts of the group, i.e., certain members, is referred to as centrally structured. Such a group has a developed nucleus about which the rest of the group is attached. A non-central or peripherally structured group is characterized by a less developed choice nucleus, by an equal dispersion of choice among its members. The most adequate measure of centrality of the choice structure is the concentration of total interpersonal choices in some fraction of the total membership (26, pp. 180-88). We may operationally define choice as the assignment of scores of *4* or *5* by the members of the group to interpersonal relationships in the group. The decision as to what fraction of the group's membership to use as the segment reflecting centrality is essentially a pragmatic question. We have chosen the top quartile of the group's members as the segment of concentration. Our measure of centrality of group structure is, thus, the per cent of the total choices given in the group that were assigned to the most chosen quartile (or the closest approximation thereto) of the group's members.

### *IV. 16. Measurement of clique formation in the group*

A final analysis of group structure concerns sub-group formation within the whole group, i.e., the absence or presence of clique formation. By use of the

matrix algebra technique (20) a simple matrix of choices (*4*'s or *5*'s) in the group can be utilized to yield all cliques in the group and the membership in these cliques. A clique is defined as a symmetrical choice relationship among any three members of a group, i.e., three members all of whom choose each other. When a clique is so defined it is possible to state the maximum number of cliques that could have been formed in a group with n-members, i.e., the permutation of n, and then to compare this figure with the actual number formed as extracted by matrix algebra. One measure of sub-group formation is, thus, the per cent of possible cliques formed within a given group.
A second, and related, measure refers to the per cent of the group's members who are members of one or another of the extant cliques. This measure easily calculated by knowing who is or is not a clique member in a given group has import as an index of the extent of sub-structurization in the group.

*IV. 17. Summary*

We have in this chapter dealt with how data were collected for our forthcoming analyses. The experimental situation was described and it was noted that all measurements were taken individually. A description was made of the development of these measures and their content which appears in the appendices. The basic scoring units to be employed in analyses in the following chapter were also outlined. Our measurements of the dependent variable fell into three general classes: 1) two rank orderings; first, of the relative importance of ten reasons for group membership to the group members; and secondly, of twelve group discussion topics; 2) scales for the measurement of how often a given subject believed himself to be communicated to by each of his fellow group members; and, 3) a forced distribution sociometric technique used as a means of collecting various evaluations of a group's members by these same members. Finally, experimental controls employed in connection with these measures were described.
Having discussed how and what kind of data were made available to us by our investigations we shall now turn to the analysis of the obtained data and the resulting support or lack thereof for our various propositions.

# CHAPTER V / ANALYSIS OF DATA AND ACCEPTANCE OR REJECTION OF THE HYPOTHESES

## *V. 1. Introduction*

We shall, in the present chapter, be faced with the problem of deciding whether and to what degree our data provide support for or against the hypotheses of this investigation. In Chapter IV we have dealt in some detail with our measuring instruments and their rational. In so doing we have also discussed the scores to be derived from these measurements. It will be our present task to describe the organization of these scores into analysable units, the rational directing the utilization of particular statistical tests, and finally, the results of these analyses as well as decisions concerning our hypotheses following from said results. Considering the unavoidable detail involved in reporting our analyses we shall have to leave discussion of the general significance of the results to a following chapter. Our report shall appear rather fragmented, each hypothesis analyzed in a manner artificially isolated from its fellows, the whole submerged temporarily in the interest of its parts. We beg the reader's indulgence until such time as our analyses of detail can be replaced by a reorganization of varified facts into a meaningful whole.

We shall first demonstrate a statistical difference in cohesion among our various groups and then relate our dependent variables to these differences.

## *V. 2. The cohesion levels in the experimental groups*

Do we have evidence from our investigation to indicate that the nine groups in our sample differ among themselves in group cohesion? The basic measure of group cohesion yielded for the 117 subjects in our nine groups the adhesion scores in Appendix VI. From these adhesion scores mean cohesion scores for each group were calculated and are listed below in Table V.1. The rank order of these groups on the dimension of group cohesion is listed to the right of the mean scores. Do these groups differ statistically from one another on the dimension of group cohesion?

*Table V.1. Mean Cohesion of the Groups and Their Associated Rank Order*

| | *Mean* | *Rank* |
|---|---|---|
| Group I | 816.2 | 9 |
| II | 949.8 | 2 |
| III | 882.9 | 7 |
| IV | 917.9 | 4 |
| V | 920.6 | 3 |
| VI | 832.5 | 8 |
| VII | 975.1 | 1 |
| VIII | 891.4 | 5 |
| IX | 885.4 | 6 |

When the various values are tested by means of the analysis of variance test the resulting "F" of 2.25 (df = 100, 8; α .05 at 2.03) exceeds that which is required at the .05 level of statistical confidence. We may not assume that these mean cohesion scores were drawn randomly from the same population, i.e., we must assume that a real difference exists in the overall level of cohesion of our groups. If a significant overall difference exists among the groups, which of the individual groups are significantly more cohesive than other groups? Student small sample "t" tests were performed upon differences between paired individual group means and Table V.2. summarizes those pair-comparisons that show statistical significance (.05). Considering comparisons between individual groups only, we

*Table V.2. Pairs of Groups Differing Significantly on Mean Cohesion*

| | | | | | |
|---|---|---|---|---|---|
| Group II | (949.8) | significantly higher than | Group I | (816.2) | α .02 |
| | | | VI | (832.5) | .02 |
| Group IV | (917.9) | significantly higher than | Group VI | (832.5) | .05 |
| Group VII | (975.1) | significantly higher than | Group I | (816.2) | .002 |
| | | | III | (882.9) | .05 |
| | | | VI | (832.5) | .002 |

may conclude that of the 36 possible mutual pairings of our nine groups, six proved to be statistically significant, specifically, Group IV > VI, Group II > I and VI, and Group VII > I, III, and VI. The remaining 30 fell short of this standard.

Although our measuring instrument meets the requirement of a parametric measure it is interesting to compare results reported above to those obtained by comparable non-parametric analysis of the same data. When the same data are analyzed by means of the non-parametric equivalent of the analysis of variance, the Kruskal-Wallis one-way analysis of variance (In: 36, pp. 184-93) we find that the difference in cohesion among our nine groups is again significant at exactly the same .05 level of confidence (H = 17.72; df = 8; α .05 at 15.51). Non-parametric equivalent of the Student "t", the Mann-Whitney U-test (36, pp. 116-27), when applied to pair-comparisons between individual groups yields exactly the same results as were reported in our discussion of the "t" test analyses. These non-parametric analyses remove any possible doubt that might exist that our data did not meet the measurement requirements of parametric measures. We may, therefore, lay claim to a broader generalization of our results. We have, thus, a sample of nine groups that do differ in their levels of cohesion as measured by our test of cohesion. In the following sections we will seek evidence in our data bearing upon the various hypotheses. In said analyses these differences in group's cohesion serve as the independent variable to which we relate various dependent variables.

### *V. 3. Agreement as to reasons for group membership as a function of group cohesion* [1]

*Hypothesis I.* More cohesive groups will show more agreement among their members with regard to reasons for group membership than will less cohesive groups.

As previously mentioned, our measure of the agreement among members of a

[1] Data appear in Appendix VII

given group as to why they wished to remain in that group was the agreement among their rank orderings of these reasons. The Kendall coefficient of concordance "W" (36, pp. 229-38) was calculated from these sets of rank orderings within a given group, i.e., a measure of the agreement among the group members' hierarchy of reasons for desiring membership in their group.
Table V.3. lists for all groups in our sample their respective "W", Chi-square, and the significance level of chi-square values. [2]

*Table V.3. Values of Concordance Coefficients and Their Associated Chi-square and Levels of Significance of Rankings of Reasons for Group Membership*

| | *W* | *Chi-square* | α |
|---|---|---|---|
| Group I | .11 | 16.1 | .10 |
| II | .38 | 41.4 | .001 |
| III | .43 | 46.5 | .001 |
| IV | .53 | 61.4 | .001 |
| V | .12 | 15.4 | .10 |
| VI | .15 | 17.0 | .05 |
| VII | .13 | 18.7 | .05 |
| VIII | .16 | 15.9 | .10 |
| IX | .31 | 28.3 | .001 |

We can see that the general level of agreement among subjects within the various groups as regards the reasons for group membership tends to be rather high. Our proposition has, however, nothing to do with the absolute level of agreement but rather with the relative level as a result of the cohesion level of the groups.
The most obvious measure of contingency between group cohesion and agreement in the group is, of course, the rank order correlation coefficient. Table V.4. shows the Kendall rank correlation coefficient (tau) (36, pp. 213-23) between group cohesion and the level of agreement as to reasons for group membership to be exactly .06, not significant.

*Table V.4. Rank Correlation between Mean Group Cohesion and Agreement Among the Groups' Members as to Reasons for Group Membership*

| | *Rank Mean Cohesion* | *Rank Agreement* |
|---|---|---|
| Group I | 9 | 7 |
| II | 2 | 3 |
| III | 7 | 2 |
| IV | 4 | 1 |
| V | 3 | 9 |
| VI | 8 | 6 |
| VII | 1 | 5 |
| VIII | 5 | 8 |
| IX | 6 | 4 |

[2] The significance of "W" depends upon: 1) the number of objects ranked, and 2) the number of persons ranking the objects. In all nine groups from our sample the number of reasons ranked were the same, namely, ten. The number of subjects (raters) did, however, vary from group to group. For this reason observed values of "W" for each group were transformed to their respective values of chi-square by means of the formula chi square equals k (n-l) W in which "k" equals the number of subjects in a given group, "n" equals the number of objects rated, and "W" is the obtained value of the concordance coefficient. *(36,p236)*. By means of this transformation all chi-square scores are directly comparable to one another.

This measure, the rank correlation coefficient, is however by no means the strongest measure of the relationship between group cohesion and agreement among members as to reasons for group membership because it measures the linear relationship between the two variables. We have not predicted that the relationship between cohesion and this type of agreement need necessarily be linear, i.e., unit increase in agreement with unit increase in cohesion. The relationship between these two variables could be linear if it were particularly strong. What, according to our theory, must be the case is that when one group is significantly higher than another in cohesion it must then be higher in agreement. The relationship between the variables may or may not be linear; it must always be positive when there is a significant difference between the groups involved on the dimension of cohesion. For this reason, the correlation coefficient while not an inappropriate measure, tends to be a rough measure of the relationship.

It is possible from our data to perform a more exact test of the relationship in question. This involves specifying the exact outcome for this sample of our theory regarding the relationship. Theoretically, we would expect all comparisons of significantly more cohesive groups to significantly less cohesive groups to result in higher agreement regarding reasons for group membership in the more cohesive groups. As noted on page 54, of the 36 possible paired comparisons of individual groups in our sample of nine groups six proved significantly different from each other in cohesion. Thus, Group VII was significantly higher than groups I, III, and VI; Group II was significantly higher than groups I and VI; and finally, Group IV was significantly higher than Group VI. We would expect, theoretically, that the agreement among group members as to reasons for group membership in the six more cohesive groups in these paired comparisons would exceed that agreement in the lower groups in these pairs. That is, as regards this form of agreement we expect Group VII to be higher than Group I, III, and VI; Group II to be higher than groups I and VI; and Group IV to be higher than Group VI. By checking in Table V.3. the reader can see that the significantly more cohesive group in these paired comparisons was in five of the six cases higher on the dimension of agreement.

What would be our theoretical expectation with regard to the remaining 30 paired comparisons in which no significant difference in cohesion existed between the groups? Since in effect our variable of cohesion is not optimally operative we should have to expect a fifty-fifty split, i.e., of the remaining 30 paired comparisons of groups not significantly different in cohesion we would expect a fifteen-fifteen split as regards which member would be higher in agreement. In other words, agreement can not be predicted from insignificant differences between the groups as to cohesion.

*Table V.5. Subjects' Agreement as to Reasons for Group Membership as a Function of the Groups' Cohesion*

| | *Level of Agreement* | | | |
|---|---|---|---|---|
| | More cohesive group greater than the less cohesive group | | Less cohesive group greater than the more cohesive group | |
| Significantly differing cohesion comparisons | 5.5 | 5 | .5 | 1 |
| Not significantly differing cohesion comparisons | 15 | 14 | 15 | 16 |

Table V.5. lists the theoretically expected and the observed number of cases in which the direction of agreement comparison follows suit upon the direction of cohesion comparison for both statistically significant and not significantly differing cohesion comparisons. That is, the group in a given comparison having the higher cohesion mean also has the higher agreement chi-square or the reverse hereof.
We may now pose the question as to whether our theoretical explanation sufficiently accounts for the empirical data.
The chi-square goodness-of-fit test can be employed to answer this question if we assume that the actual theoretical frequencies for paired comparisons of groups statistically different could just as well have been 5.5 and 0.5 respectively in place of 6 and 0. This assumption is really no great infringement upon our theory; we have merely to assume that the theoretically predicted values are in effect continuous. This assumption is necessary, of course, for computational and not theoretical reasons. [3]
The obtained chi-square for our data's deviation from theoretically expected values is .679 ($df = 1$; $\alpha = .50$). It is clear that there is no reason to believe that the division of comparisons into the various cells is different from what would be expected upon the basis of our theory, i.e., the data conform closely enough to theoretical predictions to view any deviations as the result of error variance (23, pp. 260-61). We conclude that our theory that the members of more cohesive groups would be more in agreement as regards the importance of various reasons for group membership than would less cohesive group members is borne out in the data. Hypothesis I was supported in the data.

### *V.4. Agreement as to the tasks of the group as a function of group cohesion* [4]

*Hypothesis II.* More cohesive groups will show more agreement among their members with regard to the group's tasks than will less cohesive groups.
In our analyses of the level of agreement among group members as to why they wished to remain in a given group, we made use of the Kendall coefficient of concordance to measure agreement between the subjects' individual rank orderings of the various reasons for group membership. We have also, as described in Chapter IV, obtained rank orderings of topics discussed during group meetings, i.e., group tasks, from all members of six of our nine groups. The overall agreement among individual rankings of these twelve tasks by members of the separate groups can again be specified in terms of the concordance coefficient.

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[3] We should discuss two additional problems inherent in the use of chi-square with these data. First of all, it is generally maintained that a minimum frequency of five is required in the smallest cell of a chi-square matrix. When this condition is not met "the usual computation of chi-square gives too large a value, leading to rejection of the hypothesis more often than would the direct computation of probability by factorials." (41, p 105). Since, however, in our analysis a larger value of chi-square represents evidence against our hypothesis we have retained the usual computation of chi-square. Our estimation of chi-square is, therefore, a conservative test of the hypothesis. Secondly, because our data employ 36 paired-comparisons there are, of course, dependencies among those scores. The chi-square test does not, however, under all conditions demand independence between the two indices in different cells of the matrix (31). The obtained division of entries in the cells of the matrix may, for example, be considered to be but one of a large number of like divisions. We may then employ the same logic as that underlying the Fisher test, i.e., that the row and column marginals of the matrix are fixed. The question can then be posed as to the likelihood that a division as variant with the theoretically predicted division as the one observed could have been the sole result of sampling error.

[4] Data appear in Appendix VIII.

Just as in our analysis of Hypothesis I these scores were transformed into chi-square values and are listed below in Table V.6.

*Table V.6. Values of Concordance Coefficients and Their Associated Chi-squares for Rankings of Group Tasks*

| | *W* | *Chi-square* | *Rank* |
|---|---|---|---|
| Group I | .20 | 35.9 | 6 |
| II | .523 | 69.0 | 2 |
| III | .519 | 68.5 | 3 |
| IV | .44 | 63.5 | 4 |
| V | .48 | 73.3 | 1 |
| VI | .36 | 50.8 | 5 |

We are, once again, interested in the relationship between group cohesion and agreement, this time with regard to agreement as to tasks in the various groups, i.e., the relative level of agreement contingent upon the group's cohesion. Our initial measure will be the rank order correlation between group cohesion and agreement regarding tasks. These data appear in Table V.7. below.

*Table V.7. Rank Order of the Groups on the Variables of Cohesion and Level of Agreement Regarding Tasks*

| | *Mean Cohesion* | *Task Agreement* |
|---|---|---|
| Group I | 6 | 6 |
| II | 1 | 2 |
| III | 4 | 3 |
| IV | 3 | 4 |
| V | 2 | 1 |
| VI | 5 | 5 |

Kendall's tau between these two variables is equal to *.73*, significant at exactly the *.028* level of confidence.[5] It is clear that the relationship in our sample between group cohesion and the amount of agreement in the group concerning the group's tasks is so strong that finer analyses need not be performed. It may be concluded that our hypothesis finds strong support in the data.

*V.5. Level of communication as a function of group cohesion*

*Hypothesis III-A.* The level of communication in more cohesive groups will be higher than in less cohesive groups

Our data regarding communication fully listed in Appendix IX may be partially summarized as in Table V.8.

[5] This significance test is one-tailed as theory specifically directs the direction of the prediction. All following tests, when otherwise unspecified, are also one-tailed on the same grounds.

*Table V.8. Value of Communication Scale Means, Sigmas, and Per Cent of Scale Values Above a Score of 36*

| | *Number of scales* | *Mean on scales* | *Sigma on scales* | *Per Cent High Communication (36)* |
|---|---|---|---|---|
| Group I | 240 | 37.3 | 19.5 | 54.6 |
| II | 132 | 43.6 | 15.5 | 70.5 |
| III | 132 | 43.4 | 18.1 | 65.91 |
| IV | 156 | 45.1 | 17.5 | 71.8 |
| V | 182 | 44.1 | 16.6 | 65.93 |
| VI | 156 | 39.7 | 17.7 | 66.0 |
| VII | 240 | 41.5 | 16.2 | 68.8 |
| VIII | 110 | 46.3 | 19.3 | 67.3 |
| IX | 90 | 44.2 | 21.3 | 63.3 |
| | | 42.24 | 18.0 | |

The reader will remember from Chapter IV that each subject filled in a scale for every other subject in his group ranging in value from 0-70. For example, in Group I with sixteen members each filling in fifteen individual scales there would be a total of 240 completed scales.

Also included in our data is the per cent of the members of a group assigned a value of at least *36* by fellow members. This value has special significance in that it is on the positive side of a dotted line in the middle of the scales that indicated average communication, i.e., whenever a subject assigned a score of *36* or higher to a fellow subject he clearly indicated that he felt he had been more than averagely communicated to by that particular subject. A clear qualitative judgment was made.

To what degree are differences in communication between the groups reflective of real differences? An analysis of variance performed upon the data summarized in Table V.8. yielded an "F" of 4.42 ($df = 8, \infty$; $\alpha = .01$ at 2.51) indicating significant differences. There does, however, seem to be sufficient reason for doubting the strict applicability of the analysis of variance technique to these data. The distribution of scores is in general positively skewed (non-normal) and the assumption of equal variances is untenable. The application of more appropriate non-parametric measures to these data is from a practical viewpoint uneconomical. We can, therefore, have but limited faith in a statistical decision based upon the obtained "F". Experience has taught, however, that in the vast majority of cases in which the parametric statistic's significance (well beyond .01 in this case) was so high that the corresponding non-parametric statistic was also significant at approximately the same level of confidence. It would not seem too unreasonable to assume that the obtained "F's" value, in spite of failure to meet all requirements of its application, reflects a genuine overall difference among groups in communication.

There are two major sources of information available to us in these data in assessing the relationship between cohesion and communication; the former involves all nine groups, the latter involves those groups in our sample that are statistically different from one another in cohesion.

The first of these analyses makes use of a definition of high communication in terms of scores of at least *36* on the communication scales. As mentioned, this

definition of high communication is not arbitrary in that scores of at least *36* assigned by one subject to another represented for the assigning subject a clear qualitative decision.
From Table V.8. the rank order of the nine groups can be calculated on the basis of per cent of subjects rated high in communication by other individual subjects. This rank order is shown in relation to the group cohesion rank order in Table V.9. below.

*Table V.9. Rank Order of Groups on Cohesion and High-Communication*

| | *Rank Cohesion* | *Rank High-Communication* |
|---|---|---|
| Group I | 9 | 9 |
| II | 2 | 2 |
| III | 7 | 7 |
| IV | 4 | 1 |
| V | 3 | 6 |
| VI | 8 | 5 |
| VII | 1 | 3 |
| VIII | 5 | 4 |
| IX | 6 | 8 |

Kendall's tau between group cohesion and high communication in the whole sample is .50 ($\alpha$ = exactly .038), significant. It may be concluded that high communication to a larger per cent of the groups' members is contingent upon the cohesion of the group.
A second source of support for our hypothesis comes from a section of our sample, namely, a comparison of groups of significantly higher cohesion to those of lower cohesion. We will for purposes of this analysis state operationally a definition of "communicated to" and "not communicated to" by concentrating upon the extremes of the distribution of communication scores. Our definition of "communicated to" as well as "not communicated to" will be scores on the communication scales beyond one sigma of the mean for communication scores in the entire sample. Examination of Table V.8. indicates "communicated to" so defined to be represented by a score of at least *61*; "not communicated to" by not higher than *24*; i.e., plus or minus one sigma unit of the mean 42.24. A score of *61* assigned to a member of a group by a subject will indicate that subject's perception of having been "communicated to" by said member. A score of *24* will indicate a "lack of communication" from a member. Because we have used the entire sample as a basis for defining "communicated to" and "not communicated to" the proportion of cases so defined in a specified segment of the sample is free to vary. In groups II and VII both of which are significantly higher in cohesion than either groups I or VI we should, in line with our theory, expect the subjects to perceive that they were communicated to and less that they were not communicated to by fellow members than would be the case in groups I and VI. Data in Table V.10. show the numbers of fellow subjects communicating to and the number not communicating to the subjects in these two classifications.

*Table V.10. Subjects communicating to or not communicating to fellow subjects in more as opposed to less cohesive groups*

| | *Communicating* | *Not communicating* |
|---|---|---|
| High cohesive groups | 53 | 42 |
| Low cohesive groups | 45 | 98 |

Chi-square for the above listed data equals 12.95 (df = 1; $\alpha = .0005$ at 10.83), very significant. It is clear that subjects in significantly more cohesive groups are of the opinion that more of their colleagues communicate to them in the way in which we have defined communicate to.

We should note before turning to the following hypothesis that our operational definition of "communicate to", i.e., a communication scale score of at least *61* assigned another, tended to show the same relationship to group cohesion in part of the sample as our definition of high-communication did to the whole sample. The same general relationship to cohesion of operational measures employing various segments of the total scale indicates that the choice of operational measures did not determine the results, i.e., that the measures are not arbitrary. In conclusion it can be said that Hypothesis III-A found support in the data.

### *V. 6. Adhesion and being communicated to*

*Hypothesis III-B.* More adhesive subjects will be more highly communicated to than will less adhesive subjects

In the following analysis we turn away from the cohesion of the group toward the adhesion of the individual members. The general communication measure from which the specific scores were derived is once again the communication scales indicating a subject's impression of how often he was communicated to. We are interested in how often the more adhesive subjects were communicated to within their respective nine groups. We must then decide as to whether more adhesive subjects are more highly communicated to within their separate groups than are less adhesive subjects of these groups. Our decision as to the evidence for or against the hypothesis will be based upon the analysis of one group at a time and summated to give a total picture for all groups. The chi-square test is particularly adequate to test contingencies of "adhesion-communicated-to" in the independent groups. Chi-squares for the individual groups may be added together as independent observations, each contributing one degree of freedom, and tested against significance (23, p. 268). In this manner we are able to use the individual groups as our sampling distribution and still employ the whole sample as the basis for our statistical decision.

If the individual groups are to serve as the sampling distribution our definitions of adhesion and communication will have to be specific to the individual groups. We define "more adhesive" subjects as those subjects with an adhesion score in the top quartile of such scores in their group. "Less adhesive" subjects are, similarly, defined as having scores in the lowest quartile of such scores in their respective groups. In similar manner "communicated-to" is defined in terms of a communication score assigned to a fellow member that is one sigma unit above the mean for the particular group concerned; "not communicated to" in like manner is a score one sigma below said group mean. In this manner it is possible

to answer the question of whether the more adhesive subjects in a particular group are communicated to by more members of their group than are similar less adhesive subjects in that particular group. All measures of adhesion and communication are in terms of the standards of the individual groups involved. The nine independent observations of the contingency between adhesion and being communicated to can then be considered collectively in order to test the hypothesis. Table V.11. shows said contingency for all groups in our sample.

*Table V.11. Contingency Between Adhesiveness and Number of Subjects from which Communication is Received for Nine Individual Groups*

| | *Communicated to by* | *Not Communicated to by* | |
|---|---|---|---|
| Adhesive subjects (A) | 18 | 8 | Group I |
| Less Adhesive subjects (LA) | 7 | 17 | Chi-square = 6.49 |
| (A) | 8 | 10 | Group II |
| (LA) | 7 | 6 | Chi-square = –.02 |
| (A) | 11 | 1 | Group III |
| (LA) | 9 | 8 | Chi-square = 2.71 |
| (A) | 6 | 3 | Group IV |
| (LA) | 6 | 4 | Chi-square = 0 |
| (A) | 12 | 5 | Group V |
| (LA) | 3 | 10 | Chi-square = 4.89 |
| (A) | 7 | 6 | Group VI |
| (LA) | 5 | 3 | Chi-square = 0 |
| (A) | 14 | 7 | Group VII |
| (LA) | 9 | 11 | Chi-square = 1.17 |
| (A) | 21 | 0 | Group VIII |
| (LA) | 3 | 8 | Chi-square = 10.83 |
| (A) | 8 | 1 | Group IX |
| (LA) | 3 | 6 | Chi-square = 3.84 |

As can be seen from Table V.11., chi-squares have been calculated for each of the independent observations, i.e., groups. [6] Independent observations of chi-

[6] Whenever, in any of the independent observations, e.g., groups III, VIII, and IX, the requirements of a chi-square test were not met we have utilized the lowest possible value of chi-square by first employing the appropriate Fisher small sample exact probability test (36,pp 96–104) to ascertain the exact one-tail probability associated with the contingency and then assigning to the group the lowest value of chi-square associated with the significance level obtained by use of the Fisher test. For example, the Fisher test indicates the contingency in Group III to be significant at exactly the .032 confidence level. The lowest possible value of chi-square, had Group III data allowed its direct usage, indicating similar confidence is 2.71. This value of chi-square was, therefore, assigned to the contingency in Group III. In this regard, our calculation of chi-square represents a conservative estimate of its true value

square for the nine groups were added algebraically yielding a value of 29.9 (df = 9; α is .0005 at 27.88), clearly significant. It is clear from our analysis that adhesive subjects in our sample were more highly communicated to than similar less adhesive subjects in their respective groups. Our hypothesis finds strong support in the data.

*V.7. Adhesion and the amount of communication received from fellow adhesive group members*

*Hypothesis III-C.* More adhesive subjects will communicate more to fellow adhesive subjects than to less adhesive subjects.

Does the sharing of similar interest in their group incline adhesive subjects to communicate more heavily with fellow members of similar conviction? Analyses relevant to this question were of the same general nature as those in the preceding section. In the individual groups the subjects were again divided into more adhesive and less adhesive subjects on the same grounds as previously described. "Communicated to" and "not communicated to" were also similarly defined in terms of sigma units above and below the group's communication mean. It was, in this manner, possible to calculate for the more adhesive subjects in each separate group the number of more adhesive and less adhesive subjects communicating or not communicating to them. This contingency between adhesion and being communicated to by adhesive subjects was again expressed in separate chi-square values for each of the nine independent observations, these chi-squares being summated to yield a total chi-square by means of which the statistical decision could be made.

The analysis described above yielded no significant results. There appeared in the data neither a trend favoring nor disfavoring our hypothesis. We must conclude that the data for our groups provide no support for this hypothesis nor evidence contrary to it. In view of its lack of significance one way or the other and in the interest of space the breakdown of data as regards Hypothesis III-C into various tables as was done in the preceding section is omitted. We must conclude that the data give us no support in our notion that adhesive subjects communicate more among themselves than with fellow less adhesive group members. The absence of a negative relationship, i.e., adhesive subjects communicating more to less adhesives may provide a clue to the explanation of these findings. We might propose the explanation that adhesive subjects through their higher interest in the group were motivated to attempt to bring all fellow members into the group's discussions. This would coincide with our evidence for greater communication in cohesive groups and might explain why similar interests in the group did not lead to selective communication. It must, in conclusion, be admitted however that we have no experimental evidence to back up this proposition. Further research would seem required to substantiate or reject this hunch.

*V. 8. Mutuality of interpersonal evaluation as a function of group cohesion* [7]

*Hypothesis IV-A.* Mutuality of evaluation of interpersonal relationships will be higher in more cohesive groups than in less cohesive groups.

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[7] Analyses employed to test hypotheses IV-A, IV-B, and hypotheses VII, VIII, and IX make use of data presented in Appendix X.

In the remaining analyses we will make use of data from the sociometric test administered the subjects in all nine groups.

The present hypothesis may be put to the test by examining the sociometric data concerning mutual evaluation of interpersonal pairs. We have seen in Chapter IV that every subject evaluated his ability to work with all other subjects in his group. Thus, subjects A and B both evaluated the capacity of group members A-B to work together. The number of evaluated interpersonal pairs in a given group is, of course, a function of the number of subjects in the group. The variation in number of interpersonal evaluations to be made in our groups ranged from 120 in Groups I and VII to 45 in Group IX. Because the unit involved in these measurements is based upon a forced distribution method the resulting differences between scoring units have the same values. The number of such evaluations is so substantial in all groups that we may make use of the Pearson product-moment correlation to state the degree of relationship between the value one member assigned another and the reciprocal value received from the evaluated. We will refer to the value of the product-moment correlation for this relationship in a given group as the mutuality of evaluation in that group. Table V.12., page 64, shows Pearson correlation coefficients for mutuality of evaluation in all nine groups. [8]

*Table V.12. Values of the Product-Moment Correlation for Mutuality of Evaluation in the Nine Groups*

| | *Product-moment correlation* | *Zet-score* | $\alpha$ [9] |
|---|---|---|---|
| Group I | .12 | 1.31 | .19 |
| II | .146 | 1.18 | .24 |
| III | .27 | 2.18 | .03 |
| IV | .147 | 1.29 | .20 |
| V | .30 | 2.87 | .004 |
| VI | .09 | .75 | .45 |
| VII | .24 | 2.62 | .009 |
| VIII | .45 | 3.30 | .001 |
| IX | .53 | 3.50 | .0005 |

An examination of the level of significance of the correlation coefficients for the nine groups reveals immediately that the groups may be separated into two classifications: 1) those five groups with a significant (.03) level of mutuality of evaluation, namely, groups III, V, VII, VIII, and IX; and 2) those four groups in which mutuality of evaluation is not statistically significant (.19). We may ask the question as to whether groups with significant mutuality of evaluation differ in cohesion from those with insignificant mutuality of evaluation. By use of the Median test (36, pp. 111-16) we can inquire as to whether the median cohesion of groups displaying significant mutuality of evaluation is higher than the median

[8] Because the significance of a given correlation depends upon the number of reciprocal interpersonal evaluations we have transformed product-moment correlations into zet-scores by means of the formula $\frac{r}{\sigma} = r(n\text{-}l)$, (n = number of correlated pairs) (41, pp 251-52). These zet-scores are, of course, directly comparable to one another and are accompanied by their associated levels of significance.

[9] Two-tailed as no prediction was involved.

cohesion of groups with insignificant mutuality of evaluation. Table V.13. shows the proportion of subjects in the former group with median cohesion scores above and below the total sample's median as opposed to similar figures for the latter group.

*Table V.13. Cohesion Scores Above and Below Sample Median in Groups Displaying Significant and Insignificant Levels of Mutuality of Evaluation of Interpersonal Relationships*

| | *Significant Mutuality* | *Insignificant Mutuality* |
|---|---|---|
| Individual cohesion scores above total sample median | 35 | 21 |
| Individual cohesion scores below total sample median | 25 | 32 |

Four of the 117 subjects from our total sample were dropped from this analysis in that their scores fell precisely at the median and were, therefore, unclassifiable. Chi-square associated with the contingency in Table V.13 equals 3.23 ($df = 1$; $\alpha = .05$ at 2.71) and is statistically significant. It may be concluded that groups displaying a statistically significant degree of mutuality of evaluation have a significantly higher median cohesion score than similar groups displaying an insignificant degree of mutuality of evaluation. Clear evidence is provided for our hypothesis that cohesive groups display a higher level of mutual evaluation between members than do less cohesive groups. Hypothesis IV-A was supported in our data.

*V. 9. Adhesion and preference for fellow adhesive group members*

*Hypothesis IV-B.* More adhesive group members will evaluate fellow adhesive group members higher than less adhesive group members

We retain for this analysis our usual definitions of more and less adhesive subjects in terms of the highest and lowest quartiles of cohesion scores in the respective groups. We defined high evaluation of a fellow group member in terms of the assignment of a value of *4* or *5* to one's relationship to the member; low evaluation, in like manner, refers to the assignment of a value of *1* or *2* to said relationship. We would then expect adhesive group members to evaluate adhesive fellow members higher than less adhesive group members.

In performing these analyses we proceeded in the same manner as in testing hypotheses III-B and III-C. Chi-squares were calculated for the contingency between adhesion and evaluation of adhesive subjects. These results proved insignificant in every group in the entire sample when tested by the Fisher test. We have also combined the scores from the nine individual groups to form one collective sample and tested the contingency between the level of adhesiveness of the subjects and being chosen or not chosen by adhesive subjects. The relationship in this combined sample was in the predicted direction but totally insignificant as indicated by the chi-square test. When, as described, we compressed all nine groups into one sample the resulting contingency was very slightly in the predicted direction but not at all significant ($\alpha = .35$).

In view of the data's lack of significance or of trends and because we have already fully illustrated the analytic procedure (Hypothesis III-B) we refrain from tabling the data in the interest of space. It must be concluded that our data give no support to the contention that adhesive subjects show any preference for fellow adhesives, nor is the unpredicted reverse of the relationship supported. Hypothesis IV-B is unsupported in our data.

*V. 10. Group cohesion and members' agreement as to the group's status hierarchy* [10]

*Hypothesis V.* Agreement will be higher among members of high as opposed to low cohesive groups as to the hierarchical structuring of their groups.
By hierarchical structuring of the group we mean the differentiation between members and their assignment to various status positions in the group. Status position refers to the sociometric evaluation of a member by his fellow group members. The basic measure of this sociometric status is the sum of values assigned a given group member by another group member on all of the former's relationships with others in the group. For example, in Group I with sixteen members, member A's status score from member B would be the sum of all values assigned by B to the fifteen cards on which A's name occurred (A-B, A-C, . . . A-P). In this manner every member of a given group is assigned a position in the group by all members of that group. These scores can be rank ordered for a given group member and represent his opinion as to how the group is structured from top to bottom. The amount of agreement between the members of a group as to how the group is structured is a measure of the agreement among their individual rank orderings. Kendall's coefficient of concordance is employed to measure said agreement among subjects' rank orderings. Table V.14. lists Kendall coefficients of concordance for the agreement in our sample's nine groups as to how their various groups were structured. Kendall's "W" is transformed into Chi-square for direct comparisons of group agreement and the significance values associated with the respective chi-squares are also listed.

*Table V.14. Concordance Coefficients and Associated Chi-squares with Their Significance Levels for Agreement among the Group's Members as to how the Group is Structured*

| | *W* | *Chi-square* | α |
|---|---|---|---|
| Group I | .36 | 86.4 | .001 |
| II | .22 | 28.8 | .01 |
| III | .19 | 25.3 | .01 |
| IV | .16 | 24.5 | .02 |
| V | .25 | 45.1 | .001 |
| VI | .38 | 59.3 | .001 |
| VII | .47 | 113.8 | .001 |
| VIII | .53 | 58.6 | .001 |
| IX | .42 | 37.7 | .001 |

Although not directly relevant to our hypothesis it is worth noting that the

[10] Data presented in Appendix XI.

general level of agreement among subjects in all groups with regard to the structuring of their group is extremely high. In six of the nine groups the significance level of said agreement reached .001; in the lowest group this level was at a respectable .02.

The tau between the cohesion of these groups and their level of agreement is $-.11$ ($\alpha = .76$) [11] not significant. It is apparent that this analysis provides no support for our hypothesis.

If agreement between the group's members as to the structuring of the group should be higher in cohesive groups, we might have derived the prediction that the variability should be lower in cohesive groups as to the subjects' evaluation of the ability of each member pair to work together. As noted, the values assigned to these pairs are the basic scoring unit from which our status measures are calculated.

Low variability in scores assigned to these pairs would indicate agreement among the group members as to how all dyadic combinations of members could work together. This would represent agreement as to the relationships among the group's members at a more elementary level than examined in our previous measure of hierarchical structuralization.

Table V.15. shows median variance scores for all evaluations of member pairs in the nine groups of our sample. These values were obtained by first calculating the variances of all groups members' evaluations of all member-pairs in their groups, e.g., 120 in Group I, 45 in Group IX, and then taking the median of the respective distributions of variances. When the rank order of the groups' median variances on member-pair evaluations is compared with the groups' rank order on the cohesion variable the value of the resulting tau is .08 ($\alpha = .38$), not significant. It is apparent that in our sample cohesive groups do not differ from less cohesive ones as regards their variability in evaluation of member-pairs. Our hypothesis is not supported by the data.

Table V.15. Median of Variances of Individual Pair-Evaluations [12]

| | *Variance* | *Rank* |
|---|---|---|
| Group I | .80 | 7.5 |
| II | .79 | 6 |
| III | .70 | 5 |
| IV | .86 | 9 |
| V | .80 | 7.5 |
| VI | .66 | 4 |
| VII | .545 | 2 |
| VIII | .56 | 3 |
| IX | .54 | 1 |

Two measures were presented of the degree to which the members of groups agree as to how their groups were structured. The latter measure, variation in dyadic evaluations, utilized more basic data and is, therefore, probably the

[11] Two-tailed test. Strictly speaking, no test of this hypothesis is allowed. Tau tested by means of the normal distribution function. With $n = 8$ the distribution of tau is virtually identical to the normal curve. Because of tied ranks exact probabilities for tau could not be estimated accurately from Kendall's tables. See:(18).

[12] Data for calculation of median variances are not presented in the appendices.

stronger of the two. Both measures of agreement as to structuralization showed no significant relationship to the cohesion of the groups.
Our data offer one possible answer to the reason why no relationship was found. Examination of Tables V.14. and V.15. shows that there existed an extremely high level of agreement among group members in all groups as to how their groups were structured in terms of either hierarchical organization of the group or evaluation of member-pairs as dyadic teams. The observed degree of agreement among the groups' members is even more impressive when one stops to consider the experimental task presented them. Subjects were asked not only to evaluate their own relationships with other members of the group but also the relationships extant between all other dyadic member-pairs in the group. The former judgments would not, on the face of it, appear overly difficult but we might have expected the latter to have resulted in a larger range of opinion than in fact did occur. The fact that all groups in our sample displayed extremely high agreement as to how their groups were structured reduces the possibility of showing differences between them in level of agreement that could be related to an independent variable. Put in another way, our failure to find support for the hypothesized relationship between cohesion and agreement as to how the group was structured could have been the result of an insensitive measuring instrument. We believe this hunch not to be incompatible with the data presented. The trouble is, of course, that there are a number of other logical possibilities among them that our hypothesis is false. We were, in any event, unable to find support for it or evidence against it in our data.

### *V. 11. Accuracy in predicting own status in the group as a function of group cohesion*

*Hypothesis VI.* Group members' estimates of their own positions in the group structure will be more accurate in more as opposed to less cohesive groups.
We have indicated that each group member assigns all group members, himself included, a status or position in the group. The sum of values that a given member assigned his ability to work with others in the group constituted his own estimate of his status in the group. The sum of values assigned this member's ability to work with others in the group by his fellow group members represented his actual status in the group. If we subtract the mean value of scores assigned by a given member to his ability to work with fellow members (self assigned position) from the individual's mean score for said relationships as assigned by fellow members (actual position in the group) we have a measure of discrepancy between one's position in the group as estimated by self as opposed to others. The greater the value of this discrepancy score, independent of the direction of the discrepancy, the less accurate the individual is in estimating his true position in the group. Each individual in a given group has such a discrepancy score; the median of these individual discrepancies serves as a measure of the general level of discrepancy in the group. By the use of these median discrepancy scores it is possible to inquire as to the relationship between the cohesion of a group and the degree of accuracy of the members of the group in predicting their positions in the group. Table V.16, page 69, shows the rank order of our nine groups on the median discrepancy of the groups' subjects from a perfect prediction of their positions in the groups. A rank of *1* is assigned to that group with the lowest median discrepancy, i.e., the greatest accuracy on the part of its subjects in predicting their "true" positions in the group.

*Table V.16. Groups' Median Discrepancy between Own-Other Estimate of One's Position in the Groups*

| | *Median* | *Rank* |
|---|---|---|
| Group I | .38 | 8 |
| II | .18 | 1 |
| III | .45 | 9 |
| IV | .29 | 2 |
| V | .35 | 7 |
| VI | .34 | 6 |
| VII | .33 | 5 |
| VIII | .30 | 3 |
| IX | .32 | 4 |

The rank order correlation between group cohesion and accuracy in predicting own position in the group (low median discrepancy) is .44 ($\alpha$ = exactly .06). We may interpret the strength of this correlation to represent support for our hypothesis. It appears that in our sample the groups high on cohesion tended to be characterized by members who were better able to estimate the group's opinion as to their positions in the group, than were the members of less cohesive groups, which conforms to our hypothesis.

*V. 12. The relationships between high-evaluation and/or rejection of fellow members and group cohesion*

*Hypothesis VII.* High evaluation and/or low rejection of mutual interrelationships will be more prevalent in more as opposed to less cohesive groups.

To what degree do the members of more cohesive groups as opposed to less cohesive groups accept and reject their fellow group members as work partners? Two relationships among the parts (members) of cohesive groups would follow from our concept of cohesion. Firstly, we should predict more instances of very high evaluation of interpersonal relationships in more cohesive groups. Secondly, and conversely, we should predict fewer cases of what could be called definite rejection in the evaluation of interpersonal relations in the more cohesive groups. Neither, either, or both of these relationships could occur simultaneously in the same group as we are concerned here with extreme evaluations, i.e., the relationships are not mutually exclusive in that high evaluations of parts of the group could be accompanied by rejection of other parts. Both predictions are consistent, however, with our theory.

Let us first inquire as to whether or not interpersonal relationships in cohesive groups are more often very highly evaluated than are similar interpersonal relationships in less cohesive groups. We shall operationally define an interpersonal relationship as "very highly" evaluated whenever one of the subjects involved assigns a value of *5* to it. Our measure of very highly evaluated interpersonal relationships is the per cent of total 5-scores available that group members assigned to interpersonal relationships in which they themselves were one of the pair members. These per cents are shown in Table V.17. with their rank order when the rank of *1* is assigned to the group which assigned the highest per cent of its *5*-scores to relationships in which the raters were pair members.

*Table V.17. Per Cent of Total Five Scores Assigned to Relationships in which the Rater was a Pair Member*

| | *Per Cent* | *Rank* |
|---|---|---|
| Group I | 23.4 | 5 |
| II | 31.3 | 3 |
| III | 35.4 | 1 |
| IV | 29.2 | 4 |
| V | 20.2 | 7 |
| VI | 21.5 | 6 |
| VII | 19.5 | 8 |
| VIII | 31.8 | 2 |
| IX | 13.3 | 9 |

Tau between cohesion and the per cent of *5*'s assigned to interpersonal relationships in the group equals -.17 ($\alpha$ = exactly .61),[13] not significant. It is clear that members of more cohesive groups do not very highly evaluate their interpersonal relationships with fellow members more frequently than do members of less cohesive groups.

Do members of more cohesive groups, however, less frequently reject fellow members than do members of less cohesive groups? Table V.18. shows the rank order of the groups on rejection, when rejection is defined as the per cent of *1*-scores available to the raters that were assigned to relationships in which the raters were pair members.

*Table V.18. Per Cent of Total One-Scores Assigned to Relationships in which the Rater was a Pair Member*

| | *Per Cent* | *Rank* |
|---|---|---|
| Group I | 13.3 | 6 |
| II | 6.3 | 1.5 |
| III | 10.4 | 3 |
| IV | 12.3 | 5 |
| V | 10.7 | 4 |
| VI | 13.9 | 7 |
| VII | 6.3 | 1.5 |
| VIII | 25.0 | 8 |
| IX | 26.7 | 9 |

When the rank of *9* is assigned to the group showing the highest rate of rejection, tau between group cohesion and (low) rejection is .47 ($\alpha$ = .04) [14], significant. It appears that subjects in more cohesive groups reject fewer of their colleagues than do the subjects in less cohesive groups.

In summary, as regards our dual hypothesis concerning rate of acceptance and rejection in cohesive groups, we found no evidence that cohesive group subjects evaluated more fellow members very highly but did find significant support to the effect that they rejected relatively fewer subjects.

[13] Two-tailed test.
[14] Normal distribution test.

*V. 13. Centralization of group structure as a function of group cohesion*

*Hypothesis VIII.* More cohesive groups will have a more centralized group structure than less cohesive groups.

Another aspect of groups concerns the degree to which they are centrally structured. We have presented arguments to the effect that more cohesive groups should be structured more centrally than less cohesive groups. Centrality refers to the concentration of choice in a sort of popularity nucleus of the group, i.e., a segment of the group's membership. Our operational measure of a group's centrality is that per cent of the total choices (scores of *4* or *5*) assigned to the most chosen quartile of its membership. [15] Groups with a high per cent of their total choices concentrated in one quartile of their membership will have a developed popularity nucleus, a centralized structure. Table V.19. shows the per cent of a group's choices that were concentrated in one quartile of its membership. A rank of *1* is assigned to that group with the highest choice concentration, the highest centrality of structure.

*Table V.19. Rank Order of Groups on Centrality of Group Structure*

| | Per Cent choices in top quartile | Rank |
|---|---|---|
| Group I | 36.07 | 7 |
| II | 38.18 | 3 |
| III | 37.14 | 5 |
| IV | 35.94 | 8 |
| V | 36.62 | 6 |
| VI | 37.68 | 4 |
| VII | 43.97 | 1 |
| VIII | 38.98 | 2 |
| IX | 34.38 | 9 |

Tau between group cohesion and centralization of group structure is .33 ($\alpha =$ exactly .13) and provides limited support for our hypothesis.

We may increase our confidence in the validity of this hypothesis by performing a more exact test of the relationship between choice concentration and group cohesion. This may be done by following the same procedure discussed and employed in the analysis of Hypothesis I. The 36 possible pair-comparisons of our nine groups were subdivided into those that did and those that did not differ significantly from each other on the dimension of cohesion. The number of times that the direction of choice-concentration comparison did or did not follow suit upon the direction of cohesion comparison was then noted from Table V.19 for both significantly differing and not significantly differing dyadic comparisons. Table V.20 lists these data together with the theoretically expected frequencies for the various cells of the matrix according to the theory outlined in Hypothesis I.

[15] In groups IV, V, VI, VIII, and IX adjustments were necessary in total choices made to allow for the calculations. In order to allow for calculation of the concentration of choice in exactly one quartile of the group it was necessary to adjust total membership in these groups so as to arrive at a number divisible by four. Accordingly, two subjects' total choices received were dropped from Group V and Group IX, one subject's from groups IV and VI, and finally, one hypothetical subject's score added to Group VIII. The median score for members' choices received in the groups in question were employed for these adjustments.

*Table V.20. Concentration of Choice as a Function of Group Cohesion*

| | *Level of Choice-Concentration* | | | |
|---|---|---|---|---|
| | More cohesive group greater than the less cohesive group. | | Less cohesive group greater than the more cohesive group | |
| Significantly differing cohesion comparisons. | 5.5 | 5 | .5 | 1 |
| Not significantly differing cohesion comparisons. | 15 | 19 | 15 | 11 |

Does the division of the data into the various cells of the matrix give us any reason for doubting the applicability of our hypothesis? The chi-square goodness-of-fit test indicates that the conclusion that these data do not correspond to the prediction is statistically (chi-square = 2.68; df = 1; $\alpha = .20$) untenable. We may conclude that support has been found for the proposition that cohesive groups are centrally structured.

*V. 14. The relationship between clique formation and group cohesion.*

*Hypothesis IX.* More as opposed to less cohesive groups differ as to the nature of clique formation occurring within them.

A final aspect of group structure of concern to us involves the question as to whether or not more cohesive groups display more clique formation than less cohesive groups. Festinger's data had indicated that when cliques were present and involved a large portion of the group's subjects, these groups tended to be cohesive. When, however, the cliques included a small number of the group's subjects, the groups tended to lack cohesion. He was unable to show a direct relationship between group cohesion and clique formation.
When our groups are analyzed as described in Chapter IV for number of cliques and the obtained number divided by the maximum number possible for a particular group we arrive at the per cents shown in Table V.21. The higher the per cent of possible cliques that were formed in a given group, the greater the degree of clique formation in that group.

*Table V.21. Rank Order of Groups as to the Per Cent of Possible 3-Cliques that were Formed*

| | *Per Cent* | *Rank* |
|---|---|---|
| Group I | 3.75 | 7 |
| II | .45 | 1 |
| III | 5.00 | 8 |
| IV | 1.40 | 2.5 |
| V | 2.20 | 5 |
| VI | 1.40 | 2.5 |
| VII | 2.32 | 6 |
| VIII | 6.67 | 9 |
| IX | 1.67 | 4 |

Tau between group cohesion and the number of cliques formed in the group is *.14* ($\alpha = .60$), [16] insignificant. Our data give no support for the hypothesis that more cohesive groups differ from less cohesive groups in this regard. This failure to be able to establish a crude relationship between clique formation and cohesion is in agreement with Festinger's results.

A second measure of the degree to which groups are split up into cliques is the number of group members who belong to cliques. Do more cohesive groups differ from less cohesive groups as regards the number of their members belonging to cliques? Table V.22. lists the per cent of the nine groups' members belonging to one or more cliques in their respective groups.

*Table V.22. Rank Order of the Groups as to the Per Cent of the Groups' Members Belonging to a Clique or Cliques.*

| | *Per Cent* | *Rank* |
|---|---|---|
| Group I | .88 | 9 |
| II | .25 | 1 |
| III | .83 | 8 |
| IV | .46 | 2 |
| V | .64 | 6 |
| VI | .62 | 4 |
| VII | .63 | 5 |
| VIII | .73 | 7 |
| IX | .60 | 3 |

The resulting tau of .44 ($\alpha = .12$ [17] between cohesion and the (low) proportion of the group's membership involved in cliques while statistically insignificant is most interesting. The size of the correlation is large enough to indicate a tendency for cohesive groups to have fewer of their members involved in one or more cliques. This situation is not at all strange if we assume that cliques tend to divide the group's members into warring camps, serving as it were, as a potential source of friction. These results would seem opposed, however, to those reported by Festinger. Since all of our groups were characterized by cliques the more cohesive groups' cliques should have included a larger per cent of the groups' members than similar cliques in less cohesive groups, if Festinger's proposition was true. The obtained relationship was, however, opposed to this prediction. How is it to be explained that our results do not agree with Festinger's? In the first place, it will be remembered that the relationship reported by Festinger was not based upon quantitative analysis but on qualitative observation of a smaller sample than was employed in the present research. This proposition of Festinger's was more in the nature of a hunch than of an experimental result. Secondly, as previously discussed, Festinger's measure of cohesion differs widely from ours. It must also be noted, of course, that although our evidence is much stronger in the quantitative sense than Festinger's it still falls short of a definite statistical demonstration, i.e., we consider our analyses as regards sub-group formation to have demonstrated a strong trend in our sample for cliques in more cohesive groups to involve a more restricted segment of the total group's membership.

[16] Two-tailed, normal distribution test.

[17] Two-tailed as no sound theoretical background allowed for a directional hypothesis.

In summary, as regards sub-group formation, our data reveal no difference between more cohesive and less cohesive groups in the number of cliques formed but a definite tendency for cliques in cohesive groups to involve a smaller proportion of the group's members.

### *V. 15. Summary*

We have presented in this chapter a wealth of fact and figures, some in favor of our initial propositions, some against. Before discussing the study's positive and negative findings as well as putting back together again the pieces of the whole so extensively dissected out in the present chapter we shall briefly summarize the statistical decisions which resulted upon our analyses of this experiment's data.

Nine leadership training groups served as our sample. The 117 members of these various groups were administered the cohesion test the development of which was reported in Chapter III and their individual scores on this test were combined into cohesion means for the separate groups. Non-parametric as well as parametric analysis revealed that the groups significantly differed among themselves in their levels of cohesion. Furthermore, six pairs of dyadic comparisons between individual groups demonstrated significant differences.

In relating the independent variable, cohesion, to several dependent variables, we have made use of various combinations of the original 117 cohesion test scores. We have used the term adhesion to refer to the degree to which individuals identified with their group, i.e., as a descriptive conceptualization of cohesion at the individual level. At the group level of analysis we have employed principally the rank order of the nine groups on mean cohesion and have related this to several independent variables. The groups' medians on the cohesion test have also been employed when it facilitated analysis of the data.

From the point of view of dependent variables related to cohesion the majority showed the theoretically predicted relationships. Data were presented with regard to the subjects' reasons for wanting to remain members of their various groups which conformed to a theoretical model derived from our hypothesis that agreement regarding these reasons for group membership should be higher in cohesive groups. Cohesive groups showed more mutual agreement regarding the importance to the members of the tasks presented their groups. Frequent or high communication was shown to characterize cohesive groups as a whole and more adhesive subjects in all groups were more frequently communicated to than their less adhesive brethren. Members of cohesive groups demonstrated a higher level of mutuality (reciprocity) in their evaluations of one another as work partners. Predictions of own position in the groups' status hierarchies were more accurate in cohesive groups. More cohesive and less cohesive groups' subjects did not significantly differ in very high evaluation of their fellows; more cohesive groups' subjects did, on the other side of the scale, reject fewer of their colleagues than did subjects in the less cohesive groups. Centrality of choice structure was another earmark of the structure of more cohesive groups. This was especially true of the most cohesive groups in our sample. Finally, although more cohesive and less cohesive groups did not differ in the per cent of cliques formed within them there was evidence of a trend in cohesive groups toward including fewer of the group's members in these cliques.

As well as providing support for our hypotheses in some instances our data failed to back up theoretical propositions. No support was found for our contentions

that more adhesive subjects communicate more among themselves than with less adhesive subjects or that more adhesive subjects choose fellow adhesives above less adhesive colleagues. Equally unsupported was the hypothesis that agreement would be higher among the members of more cohesive groups as to how the group was organized, i.e., as to its status hierarchy. Possible explanations of these negative findings were presented and will be expanded upon in the following chapter where we will see that these apparently negative points actually serve to illuminate the problem of cohesion.

Through a detailed analysis of data related to separate, though integrated, phenomena of groups we have sought quantitative support for hypotheses which when substantiated or rejected should shed light upon the problem of the cohesive group's nature. Our support and/or lack thereof is embodied in this chapter. What we will make of this evidence is this study's final task, the work of the next chapter.

# CHAPTER VI / DISCUSSION AND SUMMARY: THE NATURE OF THE COHESIVE GROUP

## *VI. 1. Introduction*

We have begun this study by a description in the initial two chapters of the cohesive group which we believed to be derivable from prior research. In subsequent criticisms of the measures of cohesion employed in these investigations we arrived at the conclusion that a new measure of cohesion was required. This measure was presented in Chapter III and a discussion of evidence from a validating pilot study indicated that the measure was empirically satisfactory.

In Chapter II, in addition to criticism of the cohesion measure, we also discussed a number of aspects of the function and structure of groups. We believed these aspects to be applicable to the phenomenon of cohesive groups, and further, were of the opinion that prior experimental research had shed little if any light on these problems.

By co-ordinating certain theoretical constructs extant in the social psychological literature to these problems we were able to derive specific predictions as to the nature of the structure and functioning of cohesive as opposed to less cohesive groups. These predictions served as the hypotheses or logical background for our own investigation. The methodology employed in the investigation performed to test the hypotheses presented in Chapter II was presented in Chapter IV. Results from statistical analyses of data obtained in said investigation formed the content of the preceding chapter. Discussions of these analyses were of necessity rather technical. For this reason a rather limited discussion was devoted to the confirmation or rejection of hypotheses; we were able, in effect, only to note the cold fact of acceptance or rejection of a given hypothesis without devoting any space to the significance of the resulting decision. We will now have to piece together the evidence in Chapter V to regain the thread of our project. When the pieces are reassembled we shall have obtained a new, expanded conception of the cohesive group. Let us proceed by beginning with the cohesive group inherited from prior investigations and building upon this conception with evidence pertaining to our hypotheses.

## *VI. 2. Summary of the development of a test of cohesion*

We have devoted considerable space to a description of how cohesion was measured in prior experimentation. These measures, as mentioned, fell into two separate categories. The former measure of cohesion, exemplified in the Westgate study consisted of the ratio of friends within a given group to friends in another group. The latter measure consisted of the sociometric question as to how attractive the group member thought his group to be. A number of criticisms were directed at these measures. While indicating that we believed these measures to represent measures of some components of cohesion, namely, those relating

primarily to the attractiveness to a given group member of fellow group members, we nevertheless concluded that either of these two measures would have to be considered to be an arbitrary solitary measure of cohesion. This conclusion was based upon several sources of argument. In the first place, prior investigation revealed that the in-out group friendship ratio yielded results contrary to other logical measures of cohesion, e.g., a measure of the number of isolates in the group. The same group might then be designated cohesive by the former measure and not cohesive by the latter. This line of evidence clearly advised against single measures of the cohesion variable.

A second line of argument, directed primarily against the second type of cohesion measure, i.e., the sociometric question as to how attractive a group member believed his group to be, was twofold in nature. We argued that such a single measure would be suspect on the grounds of statistical unreliability. Additionally, it was felt that this question as to "how attractive is your group?" forced the subject into an all-or-none judgment. We argued that there were various dimensions of a group which the subject could find attractive or unattractive and that he should be allowed to express independent opinions on these separate aspects. Finally, another problem was noted with regard to prior measures of cohesion of the in-out group attractiveness variety. The pragmatic objections were raised that: 1) in some instances subjects belonged only to the group under investigation and this measure could, therefore, not be employed at all, and 2) because this sociometric measure of "who are your friends?" is useful in measuring dependent variables of interest to us such as group structure, we should like to have another independent measure of cohesion. This would allow us to reserve the sociometric measure for other investigative purposes.

On the basis, thus, of both empirical and logical argument we concluded that prior measures of cohesion, while not inappropriate to the experimental setting in which they were employed, would prove less than optimal measures of cohesion. We may draw the conclusion that when we speak of the nature of the cohesive group in these studies we are, in fact, talking about the nature of what best could be described as the attractive group.

In as much as we were interested in cohesive groups we had to propose a more adequate measure of cohesion than those just described. We felt that cohesion could better be measured by the degree to which the group's members highly evaluated several dimensions of the group. Several of these dimensions were chosen from among many previously employed measurements of components of cohesion, each representing in our opinion an aspect of the total force. Other dimensions were added because they bore a known relationship to so-called "cohesive" groups.

The subject by indicating on a scale the degree to which he believed his group to possess the qualities indicated by these 22 dimensions, provided a measure of his identity with the group. This measure we referred to as the subject's adhesion score. An average of similar adhesion scores for all members of a given group would then represent the cohesion of the group.

This, theoretically, was to serve as our method for measuring cohesion. It was assumed that the measure possessed content validity. We wished, however, to have some empirical evidence for the adequacy of this theoretical instrument. Specifically, we wished to know, firstly, which of these 22 items hung together empirically; and secondly, which items would provide the best empirical measure of cohesion for groups in our sample. We turned to experiment as an answer to these questions.

The proposed cohesion questionnaire of 22 items was submitted to 114 subjects divided among leadership training groups from the Staatsmijnen in Limburg, an industrial concern engaged in the exploitation of coal and its by-products. Data obtained in this pilot study were then analyzed by means of the Wherry-Gaylord item factor analysis technique. As a result of this analysis we were able to state empirically that seventeen of the original 22 items belonged to one item-cluster. The remaining five items fell into two additional item-clusters of four and one items respectively.

Being able to state empirically that seventeen items belonged to one sub-group, four to another, and one item to neither of the first two factors, we proceeded to analyze the content of the various factors. This content analysis provided us with evidence for referring to the seventeen items of sub-group or Factor I as "identification with group" and the four items of sub-group or Factor II as "desire for interpersonal contact". The final one item factor remained unidentifiable. The data provided further quantitative justification for assigning items in Factor I unit weights and for viewing Factor I as relatively independent of Factor II.

We have been able to show that seventeen of the original content valid items belonged together empirically. We decided, furthermore, that the content of the items in Factor I provided a better a priori measure of cohesion than the content of Factor II items. We were left with the question as to whether our data provided quantitative support for our contention that Factor I items form a measure of cohesion. In this regard we made use of an independent measure of cohesion, namely, expert opinion. From the nine groups in our pilot study sample the discussion group leaders in three of the groups were able to designate one of these groups as more cohesive than the remaining two. These discussion group leaders (or experts), relying on approximately ten years' experience in similar groups, were employing the term "cohesion" in the everyday sense of the term, i.e., cohesion in the sense of "stick-togetherness", "single-mindedness of purpose", etc. This everyday criterion of cohesion served as our independent measure of cohesion.

Did our theoretical measure of cohesion, i.e., the 17 items from Factor I, distinguish between the experimental (or cohesive) group and the control (or less cohesive) group? Data from the pilot study indicated that the mean group cohesion score of the experimental group was significantly higher than the control group mean on measurements taken after the thirteenth, twenty-third, and thirty-third meetings of the groups. The groups had not differed on the initial measure taken after the groups' fourth meetings. We may conclude that Factor I of the cohesion test successfully predicted to our independent measure of cohesion.

Factor II measurements taken for the same time periods showed no significant ability to predict to the independent cohesion standard.

A second, less cut-and-dried line of evidence for the validity of Factor I items as a measure of cohesion was also presented in the data. If, as Festinger assumes, it is true that homogeneous groups should be more cohesive than heterogeneous groups, then the fact that the more heterogeneous groups in our sample (groups of lower administrative personnel from various branches of the industry as opposed to groups solely composed of foremen performing the same functions in the industry) showed a significant negative correlation with the total cohesion score in all groups would tend to support Factor I items' claim to validity as a measure of cohesion. Although this line of evidence rests upon a hypothetical

supposition with limited empirical support it does tend to dovetail with evidence related to our independent measure of cohesion.
We were able to present empirical evidence to the effect that our theoretical measure of group cohesion is valid. There remained the question of its reliability, assuming for the moment that this question can be viewed apart from the question of validity. Data from the pilot study indicated that the internal consistency coefficient of reliability for items in Factor I equaled .99. We may confidently presume that error variance was at a minimum in this measure.
In view of the evidence presented above we concluded that the seventeen items from Factor I of our proposed theoretical cohesion questionnaire constituted a reliable and valid measure of cohesion.
In a comparison of our proposed cohesion test, i.e., Factor I, and the two measures from prior experimentation discussed earlier in this section several conclusions seem possible. Firstly, our measure is tailor made for the proposed investigative sample available to us and is empirically reliable and valid. Furthermore, by avoiding undifferentiated measures of attractiveness we not only gave the subject a better chance to evaluate his group on diverse dimensions but also bring a certain structure into the concept cohesion by allowing the investigator to make a detailed statement of its content.
Based upon the criticisms and empirical evidence discussed in this section we concluded that our measure of group cohesion provided us the required measure of the independent variable cohesion which we related to dependent variables in further investigations.

### *VI. 3. Festinger's cohesive group*

Disregarding for the moment the criticisms of the measurements of cohesion employed in the various investigations of the cohesion phenomenon, let us reconstruct the cohesive group in some of its respects as it appeared in Festinger's research program. This group, theoretically, is very simple. Hypothetical subjects are highly attracted to a particular group for diverse reasons such as the group's ability to provide satisfactions, prestige, etc. Because the subjects are attracted to the group, i.e., need it, the group can exert a force upon the members in the direction of furthering obtainment of its wishes, i.e., its goals, activities, means for reaching goals, etc. This is the same as saying that the group can enforce the observance of uniform behavior patterns by its members. The sources of the group's power are virtually unlimited, i.e., they are equal in number to the reasons a member could have for wanting to stay in the group. On the other hand, the group's power is limited specifically to certain areas of influence, its authority is bounded by its members' perception of what its objectives should be. This power of the group, proportional to the group's attractiveness and exercised in a particular direction within specific boundaries, is referred to as the group's cohesiveness.
To which dependent variables has this independent variable been successfully related? In the Westgate study Festinger showed that the higher the cohesion of the group the lower the number of deviates from the group norm. Also demonstrated was the fact that deviates tended to be rejected to a greater extent in more cohesive groups. We might summarize by saying that a uniform standard of conduct was enforced to a greater extent in cohesive groups and deviation from said standard resulted in a uniform reaction from conformers, namely. rejection.

In a similar, though more restricted and better controled study, Schachter demonstrated the same effect, namely, rejection of those from the group who do not abide by the majority opinion. Of particular interest in this investigation was the author's demonstration that influence attempts were first directed toward the deviate in an attempt, as it were, to win him over to the straight-and-narrow. Only after this failed was the "sinner" rejected from the flock.

An investigation by Back although methodologically vulnerable and productive of results lacking, strictly speaking, in statistical significance, indicated that communication was higher in cohesive groups. This result is of the utmost importance as it serves as a key explanatory principle for influence processes. Of particular interest were Back's data indicating that the type of communication observed tended to conform to the group's purpose. Thus, reward orientated groups tended to engage in businesslike conversations, groups in which subjects hoped to gain prestige by virtue of membership were characterized by a more polite, reserved type of conversation, etc.

These studies and others of a similar nature tend to make clear that a so-called "pressure toward uniformity" was operative in cohesive groups upon the judgments and behavior of their members. We could conclude that the most general effects present in relation to high cohesion are rejection of deviates from existing group norms and conformity by the majority to these norms. The cohesive group, measured in terms of the attractiveness of the group to its members, may best be described in these terms. It is this type of cohesive group that was our legacy from Festinger and his associates. Our research program attempted to build upon this conception. From the point of view of the independent variable involved, i.e., cohesion, our attempts at an improvement of its measurement have already been summarized. The summarization of our attempts at extending knowledge of the cohesive group via the relating of additional dependent variables to the, in our opinion, improved measure of the independent variable will engage us in the following section.

### *VI. 4. Conformity, deviation and agreement*

It has been stressed above that the cardinal feature of Festinger's cohesive group is its successful exertion of influence or pressure toward uniformity. The group's members appear to be conformers, "other-directed" persons, "true-believers", or what not. An essential point of theoretical interest is, however, the question as to whether the group's members are conforming in the sense of kowtowing or are actually manifesting mutual agreement. Two distinct possibilities present themselves. First, the members in pursuit of some extraneous reward or rewards by virtue of membership in the group heel to with regard to some folkway or norm extant in the group with which they may or may not be in agreement. Secondly, the members' observance of a particular norm reflects an essential agreement among them regarding this behavioral standard. Of course, the resulting conformity phenomenon could always be a mixture of the two. It would presumably still be worth the effort to set up an experimental task in which explanatory emphasis could be placed on either kowtowing or agreement. Our experimental task was so designed as to be able to attribute any resulting correspondence among subjects' behaviors to agreement instead of to mere rote conformity. It is a central theoretical postulate of this investigation that members of cohesive groups show agreement among themselves with regard to certain selected key dimensions of the group's structure and function.

We have stressed that the measure of conformity by court members to the norm regarding the Westgate Council extant in their various courts in Westgate is not equivalent to a measure of agreement among the same court's members. Conformity, as indicated above, can not be a measure of agreement as we do not know the reason behind the observed uniformity. With regard to measures of rejection of deviates, while we can be sure that members of cohesive groups are agreed that these deviates should not remain in the group this type of agreement is too extreme in nature to be taken as a prototype for agreement processes in the group. We will also be interested in genuine agreement among group members with regard to relationships within the group as well as regards relationships to those no longer viewed as psychological group members. In this regard we have chosen various hypotheses with regard to areas of expected agreement among members of a group. We believe that strong theoretical foundations existed for predicting agreement in specific areas of a cohesive group's existence. The areas in question provided the content of our hypotheses. The results of the investigation may be discussed under two sub-titles or levels of analysis: 1) hypotheses at the individual level, or adhesion hypotheses, and 2) hypotheses at the group level, or cohesion hypotheses. Let us begin by summarizing results of tests of the former hypotheses and by discussing the significance of the findings.

### *VI. 5. Adhesion hypotheses: Communication to adhesive subjects*

Whenever we are concerned with communication processes a central problem involves who communicates to whom? Research on this phase of the communication process in cohesive groups has centered upon the influence process. In Schachter's study we have seen that communication in the group was initially directed toward those group members who held to deviate opinions. As soon as it became evident to conformers in the group that these deviates had no intention of changing their opinions the communication directed toward them was drastically reduced. The conformers, as appears from other data in this experiment, changed over to a policy of rejecting the obstinate non-conformers. They were, as it were, excluded from the psychological group. It is apparent that over a short time period communication in groups in which norms are operative is directed at deviates. It is, however, important to notice that communication to the deviate after the initial unsuccessful time period tends to fall off sharply. If the existence of the group is maintained over a longer time period and the deviate remains (physically, at least) a group member we might predict that communication to him would be negligible. Communication should increase to the conformers in the group.

In our experiment the expressions "conformer" and "deviate" do not apply as we are not concerned with the phenomena of norm observance. It was possible, however, to divide the membership of sample groups into those subjects strongly identified with their group and those weakly identified with their group. The former constituted the top quartile of the group's membership on the cohesion test; the latter, the bottom quartile. We referred to the first category as "more adhesive" subjects and to the second as "less adhesive" subjects. Although these terms are not synonymous with Schachter's of "conformer" and "deviate" there is, in a certain sense, an essential agreement between them. If our measurement of communication directed toward the more adhesives as opposed to the less adhesives had been taken quite early in the group's existence we might have predicted more communication to the less adhesives. However, as related, our

measure of communication referred to the number of fellow subjects communicating to more adhesive as opposed to less adhesive subjects over the entire course of the group's existence. We should expect our measure to reflect the reduction of communication to members lacking in identification with the group which should have occurred somewhat later in the group's lifespan. Our data did indeed bear out this prediction. High communication directed toward more adhesive subjects was very significantly higher than that directed toward less adhesive subjects.

This result is highly interesting for a second reason. Group cohesion is usually measured by an average of individual attraction-to-group scores. Group cohesion has, thus, been measured by a co-ordination of individual scores to group level phenomena. Some investigations have then shown that in one way or the other communication is higher in the more cohesive than in the less cohesive groups. We should, of necessity, expect that those individual subjects whose high individual cohesion scores have accounted for the high group cohesion would also be the individual subjects whose communication scores have accounted for the high group communication. Otherwise we should be presented with a rather illogical situation. This demonstration that the members who make the group cohesive are the same members who make it communicative is inherent in our analysis of this hypothesis.

*VI. 6. Communication among adhesive subjects*

We have seen that subjects highly identified with their group were more highly communicated to than similar group members who were lowly identified with their group. We have, thus, been able to make a specific prediction regarding the direction of communication in the group. It seemed possible to further specify this prediction. In order to do so we made use of a theoretical construct of Newcomb's to the effect that similarity in attitudes tends to increase the likelihood that communication will be rewarding in nature. The subjects involved in such hypothetical mutual communication provide support for each other's opinions. This support is mutually rewarding and tends to promote a mutual desire for perpetuation of communicative contact.

We have hypothesized for the subjects in a group that their group should represent for them a valent object in their environments. Agreement or disagreement as regards this valent object should tend to be expressed in the mutual communication between the group's members and, further, should tend to make the communication either rewarding or unrewarding. Adhesive subjects should find support for their perception of their group in conversations with fellow adhesive subjects. This should prove rewarding and should promote increased communication among adhesives. The same adhesive subjects should fail to find support for their perceptions of the group in conversations with less adhesive subjects. These mutual communications being unreinforced should tend to diminish in time. We expected, therefore, that more adhesive subjects should tend to communicate more with fellow adhesive subjects in their groups than they would with less adhesive subjects.

Data from our experiment did not tend to conform this proposition. Adhesive subjects did not show any particular preference for fellow adhesive subjects as targets of communication.

How are we to explain this result? In the first place, we must take a somewhat closer look at the theory directing the hypothesis. The failure of our data to

confirm the hypothesis may be inherent in the nature of this hypothesis. Newcomb's hypothesis states that the greater the agreement between subjects' values the greater is the communication to be expected between them. The problem, at the experimental level, is to select an area of values of sufficient import to the subjects that agreement will produce the hypothesized attraction and communication.

Newcomb has had both success and failure in doing so in his own researches. When he chose as his objects for value agreement a very wide ranging potpourri of specific attitude objects the results were "disappointing". He did, however, experience success with the Allport-Vernon generalized attitude scales (26, pp. 36-41). This, as well as our data, tends to point up an essential weakness in the hypothesis per se. It may be that the hypothesis is too generally stated. Specification is needed of those value-objects that are important enough to the subject to determine his liking of or communication to another who does or does not react similarly to them. Newcomb's work represents a long step in this direction with regard to the phenomena of interpersonal attraction. In this regard his negative findings alluded to above may actually be viewed as a positive contribution to elucidating the problem. In a similar vein our results although negative in relation to the experimental hypothesis serve nevertheless as an illumination of the problem of communication in cohesive groups. In as much as we know from verification of the preceding hypothesis that more adhesive subjects do receive more communication than less adhesive subjects, we might well hazard the proposition that this fact explains the data's lack of support for the present hypothesis. It could be that more adhesive subjects make more attempts at communicating to the whole group because they value the group per se higher than do less adhesive subjects. Their interest in the whole group would then tend to outweigh the value-agreement they share with fellow adhesive subjects as a determiner of their communication targets. This proposition is not incompatible with our data.

*VI. 7. Choice between adhesive subjects*

This hypothesis, to the effect that more adhesive subjects should tend to choose fellow more adhesive more often than less adhesive fellow group members, is actually another application of the previously discussed hypothesis from Newcomb. Data relevant to this hypothesis when analyzed yielded results very similar in nature to those just discussed. The most economical explanation of the data's lack of support for our hypothesis would seem again to be in terms of the more adhesive subjects' interest in the group as a whole as opposed to special attraction to any of its parts. Taken in conjunction with the negative findings regarding the prediction of direction of communication among more adhesive subjects and the positive findings regarding communication to more adhesive subjects by the whole group, we may increase our confidence in the proposed explanation for the apparently negative results. We believe that these findings which were negative in the sense of not allowing us to conclude in favor of the preceding two subhypotheses do, nevertheless, shed considerable light on the problem of cohesive groups. The fact that the hypotheses were unconfirmed, taken in conjunction with confirmation of higher communication to adhesives by the group as a whole, indicate that these subjects who were highly identified with their group tended to be highly identified with the whole group and not only with some particular segment of the group.

*VI. 8. Cohesion hypotheses: reasons for group membership*

One source of evidence to the effect that cohesive groups are characterized by genuine agreement among their members would be a demonstration that they were in essential agreement as to why membership in a particular group was of value to them. If the members of a group individually were to evaluate some possible reasons for finding their group attractive and it could be shown that members of more cohesive groups were more in agreement as to the differential importance of these reasons than were members of less cohesive groups, then we would have shown actual agreement to be a distinguishing characteristic of cohesive groups. Moreover, this type of agreement is of crucial importance because it indicates consensus among members as to the very source of all group life, i.e., the individual's motivation for belonging to the group.

As measure of the dependent variable involved in this proposed relationship to cohesion we chose ten reasons particular to our sample's groups. This type of measure has certain advantages over a measure employing generalized reasons for belonging to any type of group. In the first place, it probably would appear more "real" to the subjects involved as it does not allude to certain characteristics of "groups in general" that might only vaguely apply to this specific group.

Secondly, because the reasons employed were specific to the situation there was less chance that the subjects' individual rankings would be affected by social stereotypes. Variability in rankings should tend to be maximized.

As is the case with almost all choices, certain disadvantages accrued to this measures usage. Because the measure is more or less specific to our sample the results are less generalizable. Such a measure is also, of necessity, a priori, i.e., it strongly reflects the personal judgment of its author. Finally, as noted, another investigator, Newcomb, had difficulty in relating a list of specific, non-generalized, attitudes to attractiveness variables. It was apparently difficult to choose attitude areas of real interest to all subjecs in his sample. Newcomb's list of attitudes was similar to our list of reasons for group membership in that they both contained items of a quite specific nature.

Our data indicated the tenability of the hypothesis that the members of more cohesive groups as opposed to less cohesive groups would be more in agreement as to the relative importance to them of the various reasons for group membership. This result tended to hold specifically for those groups which differed statistically from one another on the dimension of cohesion. The effect was not so strong that a linear relationship existed between the variables. It was concluded that the evidence in the data satisfactorily supported the theory.

*VI. 9. Agreement as to the relative importance of various tasks to the group*

We have presented reasons for expecting the cohesive group's members to be in agreement regarding their individual estimations of the importance of various group tasks. As indicated, the tasks or goals of a group represent a decidedly important aspect of its existence. A group the members of which were in disagreement regarding what was important for it would lack the unity of purpose that should characterize a cohesive group. For the members of the groups in our sample the decided impression existed that the morale of the group was to an exceedingly great extent determined by their impression of the groups' tasks.

The tasks presented to the subjects consisted of twelve lecture topics and/or group discussion topics stressing human relations training as well as general in-

formation about various departments of the Staatsmijnen. The subjects rank ordered these topics individually according to their hierarchy of importance to them personally.
The data indicated a strong relationship between the cohesion of the group and the level of agreement among the group's members as to the tasks' hierarchy of importance. Strong support was presented for this hypothesis that cohesive group members share a unified perception of what is and is not of central importance to the group.

*VI. 10. The communication level in cohesive groups*

We have already dealt with the results of our investigations of communication phenomena at the individual level under the rubric of adhesion. In addition to these findings we have also tested the hypothesis that communication in more cohesive groups would be higher than in less cohesive groups. It was noted that Back had previously investigated this phenomenon and concluded that communication was more frequent and intense in his more cohesive groups. Back's study lacked, however, an acceptable independent measure of the cohesion of his groups. Furthermore, his groups were dyads which provide a poor basis for generalization to larger groups. Other investigations of the cohesion-communication contingency were also cited. They tended to measure attraction-to-group instead of cohesion. It seemed profitable to measure communication in relation to a more suitable measure of cohesion in long standing larger groups.
Two lines of evidence presented themselves in our data. Firstly, we were able to show that the correlation between high communication and the cohesion of the sample's groups was positive and clearly significant. Secondly, considerations of the contingency cohesion-communication in four groups divided into two samples differing significantly in group cohesion revealed that in the more cohesive group subjects tended to be communicated to by more of their fellow members. This relationship was, indeed, very significant. We were able to conclude unequivocally upon the basis of our data that the level of communication was higher in cohesive groups.

*VI. 11. Mutuality of evaluation in cohesive groups*

In addition to group level analyses concerned primarily with certain functions in cohesive groups, investigations of the sociometric structure of these groups were also performed. The first of these refers to the reciprocity of interpersonal evaluations in the groups. By mutuality of evaluation we referred to one individual's evaluation of another as a function of that other's evaluation of him. This definition was not restricted to high or positive evaluation, i.e., to what is usually referred to as choice. We were concerned with the degree of balance in interpersonal evaluations as a function of the level of cohesion in the group in which they occurred.
Product-moment correlations were employed to state the level of balance in a group's interpersonal evaluations because the number of evaluations in all groups were substantial and also because the scoring units involved in the evaluations were, as a result of the methodology employed, characterized by equal distance between units. Level of mutuality of evaluation in each group was represented, therefore, by a correlation coefficient.

In five of the nine groups mutuality of evaluation proved to be statistically significant. In the remaining four groups no grounds existed for a similar judgment. It was possible to show that the median level of cohesion in the former groups exceeded that in the latter.
We were able to conclude that groups with significantly higher cohesion possessed significant mutuality of evaluation, i.e., their interpersonal relationships were balanced.
This result is of no mean importance. A group, to be able to utilize its full cooperative potential must have members who know how they stand in regard to other members in the group. These members must positively evaluate those who positively evaluate them. It is not crucial to a group that everybody esteem everyone else, but in the interest of teamwork it would seem essential that the sentiments extant in the group be mutual.

*VI. 12. Agreement as to the groups' hierarchical structures*

We have been able to demonstrate that more cohesive groups in our sample tended to display a higher level of communication than did the sample's less cohesive groups. It seemed logical to assume that this communication would result in a more accurate fund of information available to cohesive group subjects regarding group members' opinions as to many dimensions of the group. Autistic processes operative upon subjects' evaluations should have been minimized. If we assume that one is attracted to those whom one believes attracted to oneself, we can interpret the affirmation of the preceding hypothesis as evidence for the minimalization of autistic processes acting upon subjects' evaluations of pairs to which they were member. Subject A rates B highly at least partially because he believes that B holds a similar opinion of him. Anything else would represent masochism. The fact that subjects in cohesive groups were indeed more accurate in "predicting" balance increases our confidence that accuracy in interpersonal judgments was at a high level in these groups.
We turned in the present hypothesis from predictions regarding interpersonal evaluations, i.e., evaluation of relationships to which the evaluator was member, to a prediction involving the evaluators' agreement in predicting non-interpersonal evaluations, i.e., those pair relationships to which he was not member. If, as we have argued, cohesive group members because of the group's atmosphere, are capable of better evaluations of all dyadic relationships in their group and if these subjects are employing a shared standard of evaluation, then they should be more in agreement with each other as to any given fellow member's relationships with the group as a whole.
Each subject in a group by evaluating the interrelationships of all other subjects in the group assigned each of them a status. When these statuses were rank ordered for a given evaluator this rank ordering represented the evaluator's estimate of the group's hierarchical structuralization. The hypothesis was then tested that agreement would be higher among those rank orderings of the status positions of fellow subjects in cohesive groups.
Two separate tests of our hypothesis were performed with the experimental data. As discussed above, in the initial test the degree of agreement between the individual rankings was calculated for each group and these levels of agreement correlated with the groups' cohesion scores. In a second and independent test of the hypothesis, the various groups' median variance scores for individual dyadic evaluations were taken as an estimate of the group members' agreement as to the

evaluation of all relationships in the group. Following theory, we predicted: 1) a significant positive correlation between group cohesion and level of agreement for the first test of the hypothesis, and 2) a positive correlation between (low) group median variance scores and group cohesion on the second test.
Our data supported neither prediction. The correlation between group cohesion and agreement among individual hierarchical status rankings was very slightly negative and totally insignificant. The correlation between (low) median variance scores and group cohesion was positive, somewhat higher than the correlation in the first test of the hypothesis, but also insignificant. The latter test was probably the more exact test because it employed more elementary data. In any event, the data did not support the hypothesis.
Any attempt at explaining these inconclusive results will have to be prefaced by directing the reader's attention once again to the experimental task presented the subjects in order to obtain the data used in testing this hypothesis. It will be remembered that each subject evaluated all interrelationships in his group. In two of our groups the subjects evaluated 120 interrelationships of which only fifteen involved the raters personally. These evaluations served as the basic scoring unit which, when summated as described, yielded the subjects' hierarchical evaluations of the status positions of the subjects in their group. Agreement among such rankings by all subjects of a given group represented the group's agreement level. Examination of the data reveals that for all groups in our sample these agreement scores were very high indeed. This indicates, of course, that subjects' agreement had to be very high as to the evaluation of both interpersonal and non-interpersonal dyadic relationships. That agreement as to the evaluation of interpersonal mutual relationships could be quite high is not overly surprising. That agreement in evaluations should have been as high as it was among subjects in all groups as regards dyadic relationships to which the evaluators did not belong is clearly surprising. We are forced to the conclusion that subjects in all of the sample's groups, irregardless of the level of the group's cohesion, were very much agreed as to how the various dyads in their group could work together. This, of course, reduced to nil the amount of variance that could be related to the independent variable cohesion. In as much as it would be difficult working within the present methodological framework to devise a more exacting experimental task for measuring agreement as to how the group is structured, we must conclude that our sample provided a poor testing ground for the present hypothesis. We were forced to conclude that no evidence was presented in the data to support our hypothesis. It seems feasible to conclude that this failure may well have been an artifact of the subjects' unusually good knowledge of each other's interrelationships.

### *VI. 13. Cohesive groups' subjects' accuracy in estimating their positions in the group*

Whenever self-evaluations are made autistic factors influence these evaluations. One tends to evaluate oneself higher than others do. Subjects in our groups made self-evaluations when they estimated how well they could work together with their fellow subjects. We may assume that these judgments were affected by ego-defense processes. The question is to what degree were these judgments affected and what relationship did this bear to the cohesion level of the group in which the evaluations were made?

We have, as mentioned, presented evidence to the effect that communicative processes in cohesive groups tended to reduce the effect of autistic processes in dyadic interpersonal evaluations. These dyadic interpersonal evaluations when summated for a given individual represented his self-assigned status in the group. We considered the average evaluation of these same dyadic relationships by all fellow subjects in his group to be representative of this subject's "real" position in the group. It was then possible to inquire as to whether the subject perceived his relationships to the group in the same manner that these relationships were perceived by his fellow subjects in the group. The smaller the discrepancy between these two measures, the more accurate the subject in perceiving these relationships. If cohesive groups were characterized by better knowledge on the subjects' part of where they stood in the group then said evaluations should have been more accurate.

The hypothesis above was supported in our data. More cohesive groups were characterized by lower discrepancy scores between subjects' own evaluations of their relationships to the group and similar evaluations by the whole group. We concluded that cohesive groups were characterized by better knowledge on the part of their subjects as to where they stood in the group.

*VI. 14. Acceptance and rejection of fellow group members*

We have attempted to portray the atmosphere in cohesive groups by inquiring after the members' evaluations of one another. Independent of the absolute level of interpersonal evaluation, we have seen that interpersonal relationships in the cohesive group were balanced. With regard to the absolute level of evaluation of fellow group members it was proposed that high evaluation and/or low rejection of mutual interrelationships should earmark the cohesive group. The data indicated that while very high evaluation of fellows was independent of the group's cohesion, rejection was significantly lower in the more cohesive groups. The hypothesis was partially supported and, further, indicated that tolerance as opposed to exceptionally high evaluation of fellow members was descriptive of interpersonal relationships in cohesive groups.

*VI. 15. Centralization of group structure*

Our hypothesis that more cohesive groups should be more centrally structured than less cohesive groups was supported. This was especially true of our most cohesive groups. We found that concentration of choice in parts of cohesive groups led to the development of what has been referred to as a choice or popularity nucleus. This nucleus served as a focal point for the group's informal organization.

*VI. 16. Cliques and cohesive groups*

Hypothesis IX, to the effect that more and less cohesive groups should differ as to the nature of clique formation within them yielded mixed, though illuminating, results. Previous experimentation directed at this problem had yielded results of such an unclear nature that we felt ourselves faced with an ambiguous theoretical situation. We considered probings in this area to be exploratory in nature.

Clique formation was measured in terms of the observed per cent of the maximum possible number of three person mutual choice relationships in the various

groups. A matrix algebraical technique was employed to extract these cliques from choice matrices for the groups. The per cent clique formation was then related to the groups' cohesion and the resulting correlation proved insignificant. This result conformed to prior findings that the relationship between clique formation and group cohesion is not simple and unambiguous.
A second analysis, which related the per cent of the groups' membership involved in one or more cliques to the cohesion of the groups indicated that cohesive groups tended to be characterized by fewer of their members being involved in cliques. This relationship was, strictly speaking, not statistically significant. The correlation between group cohesion and (low) per cent of members involved in cliques was, however, large enough to allow the conclusion that a definite trend in our data pointed in the above direction.
This result did not conform to previous findings. Although the size of the correlation involved precluded definite conclusions it was pointed out that our data seemed stronger in nature than the data from the prior investigation referred to above. It was also mentioned, however, that variant measures of cohesion were employed in the two studies.

### *VI. 17. The cohesive group: Summary of conclusions*

We have at various points in this and other chapters dealt extensively with what we have called the cohesive group. What Festinger and his colleagues called the cohesive group is, as we have seen, something at least a little short of that. His "cohesive" group could in some ways better be called the "attractive" group as has been pointed out by his critics. We do not, however, wish to make too much of the point. Measures of attractiveness do tap a very considerable source of cohesiveness. In such situations as Westgate similar measures could not be accused of arbitrariness. The problem is, rather, that attractiveness is not really equivalent to cohesiveness at the level of logical analysis. In some samples attractiveness measures would measure something very different from cohesion measures. This is, for example, evidently the case in our experiment. We believe, for example, that the measure of the independent variable in our study can be considered a measure of cohesion. The reader will notice that in this measure the first item served as a measure of attractiveness. This item is practically identical to measures of cohesion employed by Schachter. In our data its point-biserial correlation with our total measure of cohesion was only .51. It is significantly related to cohesion as we measure it but still has a shared variance of only .26 with the total measure of cohesion. It is clear that other components of the cohesion variable remain unmeasured if only global measures of attraction are employed. This should serve as a warning that our "cohesive" groups were not wholly identical to those of prior research.
The cohesive group that we did inherit was a group in which the members collectively were capable of enforcing a uniform pattern of behavior upon the group's membership. Because the exertion of influence was a cardinal feature of these groups, communication in them tended to be at a high level.
Aside from the fact that we believe our measure of cohesion to have been more suitable, our contributions to the elucidation of the nature of cohesive groups fall into several more or less distinct categories. In the first place, the present study indicated that not only rote conformity earmarks these groups, but rather that they are distinguished from less cohesive groups by genuine agreement among

their members with regard to various aspects of importance to any group. It has been demonstrated that the members of cohesive groups show mutual agreement as to why the group was of value to them, as to what was important to the group, and as to where individual members stood as regards their ability to work together as pairs.

A second area of knowledge regards autistic processes in the group. We were able to show that cohesive groups were characterized by members whose own estimations of their relationships to the group coincided with others' estimations of said interrelationships.

A third source of knowledge of cohesive groups relates to the members' impressions of one another. Cohesive groups were not so much characterized by an exceedingly high evaluation of more of their members as they were by the fact that fewer members were outright rejected. We might say that a certain tolerance prevailed in cohesive groups.

A fourth source of knowledge relates to structures present in cohesive groups. Centrality of structure characterized cohesive groups. There were members in these groups who held the group together by means of their high attraction to the majority of the group's members.

The problem of sub-groups and cohesion was brought into another focus by virtue of our results. A previous study indicated that sub-groups in cohesive groups tended to be large, i.e., to encompass a large per cent of the groups' membership. Our results were to the contrary. Both studies employed similar measures. The problem would seem to merit further investigation, perhaps, with different measures of clique formation.

Fifthly, we have, with mixed success, investigated the problem of cohesion at the individual level, i.e., at the level of the individual's adhesion to the group. Prior investigation indicated that communication tended to be directed at deviates. We have been able to show that communication was directed at those subjects most identified with the group. We have shown that those subjects who make the group cohesive also make it communicative.

Also at the individual level we have argued without any statistical support but with several sources of circumstantial evidence that subjects highly identified with their group tend to communicate to as well as choose within their group without preference for any specific segments of the group. They show, as it were, interest in the whole group. This we proposed as a hypothesis of possible investigative value.

As a sixth and final contribution we were able to show that members of cohesive groups felt themselves more communicated to than similar members of less cohesive groups. This subjective impression not only probably corresponds to the real situation in the groups over a long time period but, additionally, tells us something about the atmosphere in cohesive groups. People in cohesive groups were of the opinion that others in their group took the trouble of orientating themselves to them.

The data from this investigation did, then, provide quantitative support for a number of hypotheses designed to inquire after the nature of the cohesive group. The affirmation of these hypotheses provides a quantitative basis for illustrating certain group phenomena in relation to the cohesion variable. From these illustrations an enlarged picture of our legacy, the cohesive group, was constructed as above. We hope that the study has been able to provide a modest contribution to knowledge of the cohesion phenomenon. With the expression of this hope we bring the study to its official conclusion.

## SAMENVATTING [1]

Deze studie is erop gericht geweest de invloed te onderzoeken van differentiële niveaus van cohaesie op bepaalde structuren en functies van de groep.
De directe achtergrond van dit onderzoek is de zeer bekende reeks van studies uitgevoerd onder leiding van Festinger en zijn medewerkers waarvan het onderzoek in het Westgate wooncomplex het meest bekend is.
In deze studie is groepscohaesie gedefinieerd als het gehele veld van krachten dat op een persoon inwerkt en waardoor hij wordt beïnvloed zich te vereenzelvigen met de groep.
De meting van de cohaesie bestaat in het Westgate onderzoek uit het bepalen van de verhouding tussen het aantal vrienden binnen en buiten de groep.
Een andere maatstaf voor het bepalen van cohaesie is het antwoord van de proefpersoon op de vraag „Hoe aantrekkelijk vindt U deze groep?", een antwoord dat wordt aangegeven op een in graden verdeelde schaal. Aangetoond werd dat het aantal afwijkingen van de groepsnormen en het verwerpen van leden die afwijken van de groepsnormen, belangrijke variabelen zijn die nauw samenhangen met cohaesie van een groep.
Om het onderhavig onderzoek van het verschijnsel cohaesie te kunnen uitvoeren werden wij gedwongen een nieuwe meting van cohaesie te ontwikkelen. Dit besluit is gebaseerd op bepaalde kritieken van vroegere metingen die werden besproken.
Wij waren van mening dat men er in vroegere metingen niet in is geslaagd op voldoende wijze verschillende bronnen van cohaesie te meten. Om die reden werd een nieuwe meting van cohaesie ontwikkeld waarvan de betrouwbaarheid en geldigheid voor onze experimentele steekproef is nagegaan.
De steekproef die in onze onderzoeken werd gebruikt bestond uit negen kadervormingsgroepen uit een grote onderneming die een aantal kolenmijnen en een chemische industrie omvat.
Elk van deze negen kadervormingsgroepen bestond uit tien tot zestien employees van de genoemde onderneming, die in 35 bijeenkomsten als groep samen kwamen gedurende een periode van bijna een jaar.
Van deze negen groepen bestonden er vijf uit beambten en vier uit bazen. Om een reeks van hypothesen betreffende de samenhang tussen de verschillende niveaus van groepscohaesie en bepaalde structurele en functionele aspecten van een groep te toetsen, werden verschillende metingen op het einde van de kadervormingscursus in de experimentele groepen verricht.
Deze metingen kunnen als volgt worden samengevat:
1 Metingen van de niveaus van cohaesie van de negen afzonderlijke groepen.
2 Metingen van de overeenstemming tussen de individuele leden van elke groep wat betreft de relatieve belangrijkheid van de verschillende redenen voor de leden van de groepen om lid van een groep te willen blijven.
3 Metingen van de overeenstemming tussen de leden wat betreft de verschillende taken van de kadervormingsgroepen.
4 Metingen van de communicatie-niveaus in de afzonderlijke groepen.
5 Sociometrische metingen van de tussenmenselijke verhoudingen der groepsleden.

[1] Vertaald door Dr. G. Koene.

Uit de gegevens verkregen door middel van bovenvermelde metingen hebben wij statistische steun kunnen vinden voor de volgende conclusies:
1 Leden van meer cohaesieve groepen toonden hogere onderlinge overeenstemming wat betreft hun oordeel over de reden waarom ze graag lid zouden willen blijven van de groep en toonden tevens meer onderlinge overeenstemming wat betreft het belang dat zij voor zich persoonlijk hechten aan de taken die aan de groep werden opgedragen.
2 Het communicatie-niveau was hoger in meer cohaesieve dan in minder cohaesieve groepen. De groepsleden die zich in hoge mate met hun groep vereenzelvigden hadden een beter communicatief contact met hun medeleden dan diegenen die zich minder met hun groep identificeerden.
3 Er is meer wederzijdse waardering van de groepsleden in de meer cohaesieve dan in de minder cohaesieve groepen.
4 Het schatten van het eigen vermogen tot samenwerken bleek nauwkeuriger te zijn in de meer cohaesieve dan in de minder cohaesieve groepen.
5 In de meer cohaesieve groepen werden minder personen verworpen door de medeleden van de groep.
6 Cohaesieve groepen werden gekenmerkt door een gecentraliseerde keuzestructuur.
7 In de meer cohaesieve groepen bleken minder leden deel te hebben uitgemaakt van sub-eenheden van de groep, dan het geval was in de minder cohaesieve groepen. Het statistische bewijs van deze laatste conclusie is niet geheel voldoende gebleken.
Naast de bovengenoemde hypothesen die door de gegevens werden bevestigd waren er ook enkele hypothesen waarbij deze bevestigingen niet konden worden verkregen. Voorspeld werd dat groepsleden die zich in hoge mate met hun groep identificeerden meer zouden communiceren met alsook de voorkeur zouden geven aan medegroepsleden die zich met hun groep vereenzelvigden, boven groepsleden die deze identificatie met de groep niet bezaten. In de vorm van hypothese werd voorts gesteld dat de onderlinge overeenstemming binnen de groep wat betreft de beoordeling van het relatieve vermogen tot samenwerking van de leden van de groep hoger zou zijn in meer cohaesieve dan in minder cohaesieve groepen. Voor deze hypothesen kon in de experimentele gegevens geen bevestiging worden gevonden. Mogelijke verklaringen van deze negatieve uitslagen werden besproken.

## ZUSAMMENFASSUNG [1]

Das Ziel dieser Untersuchung ist eine Vermehrung der Kenntnisse vom Einfluss verschiedener Stufen von Kohäsion auf bestimmte Gruppenstrukturen und -funktionen. Sie stützt sich auf die bekannten Studien von Festinger und Mitarbeiter, von denen die über den sogenannten Westgate Wohnkomplex die bekannteste ist. Hierin wurde Gruppenkohäsion definiert als „das gesamte Kraftfeld, das auf das Subjekt in Richtung auf die Gruppe hin einwirkt". Die Messung der Kohäsion bestand in der Westgate Untersuchung aus der Bestimmung des Verhältnisses der Anzahl der Freunde eines Gruppenmitgliedes innerhalb und ausserhalb der Gruppe. Ein zweites Mass zur Bestimmung der Kohäsion, das in anderen Untersuchungen angewandt wurde, ist die abgestufte Antwort einer Versuchsperson auf die Frage: „Wie anziehend ist diese Gruppe für Sie"? Es konnte gezeigt werden, dass die Anzahl der Abweichungen von den Gruppennormen und die Ablehnung von Mitgliedern, die von den Gruppennormen abweichen, wichtige Varianten sind, die eng mit der Gruppenkohäsion zusammenhängen.

Um unsere eigenen Untersuchungen über kohäsive Gruppenphänomene durchführen zu können, sahen wir uns veranlasst, neue Masse zur Bestimmung der Kohäsion zu entwickeln. Dieser Entschluss gründet sich auf unsere kritische Beurteilung früherer Messungen. Unserer Ansicht nach gelang es bisher nicht, die vielen möglichen Ursachen der Kohäsion in befriedigender Weise zu messen. Daher wurde eine neue Methode zur Messung der Kohäsion entwickelt und ihre Zuverlässigkeit und Gültigkeit im Rahmen unserer Experimente bewiesen.

Unsere Versuchsobjekte waren neun Ausbildungsgruppen für Personal eines grossen Unternehmens der Kohlefördernden und -verarbeitenden Industrie. Jede dieser 9 Gruppen setzte sich aus 10-16 Angestellten dieses Unternehmens zusammen, die sich etwa 35 mal im Verlaufe eines Jahres in dieser Form trafen. Fünf dieser Gruppen bestand aus unteren Verwaltungsangestellten, vier aus Vorarbeitern.

Um eine Reihe von Hypothesen über den Zusammenhang zwischen den verschiedenen Abstufungen von Gruppenkohäsion und bestimmten strukturellen und funktionellen Aspekten, die in einer Gruppe auftreten, prüfen zu können, wurden gegen Ende des Kursus an den Gruppen Messungen vorgenommen.

Diese Messungen können folgendermassen Zusammengefasst werden:

1 Messung der untereinander verschiedenen Kohäsionsniveaus in den neun Gruppen.

2 Messung der Übereinstimmung zwischen den einzelnen Mitgliedern jeder Gruppe im Hinblick auf die Wichtigkeit der verschiedenen Gründe für die Mitglieder der Gruppen, Mitglied bleiben zu wollen.

3 Messung der Übereinstimmung zwischen den Mitgliedern im Hinblick auf die verschiedenen Aufgaben, die den Kursusgruppen gestellt werden.

4 Messung der Verständigungsmöglichkeiten in den verschiedenen Gruppen.

5 Soziometrische Messungen zwischenmenschlicher Beziehungen der Mitglieder einer Gruppe.

Die Ergebnisse dieser Messungen sind statistisch signifikant und lassen die folgenden Schlüsse zu:

1 Mitglieder kohäsiverer Gruppen zeigten eine höhere Übereinstimmung in dem Wunsche, zu dieser Gruppe zu gehören, sowie in der Beurteilung, welche Aufgaben der Gruppe für sie persönlich am wichtigsten seien.

[1] Übersetzt von Dr. R. LAMBERT

2 Die Verständigung untereinander war höher in kohäsiveren als in weniger kohäsiven Gruppen. Ausserdem war die Verständigungsbereitschaft von Mitgliedern einer Gruppe grösser gegenüber Mitgliedern, die sich mit der Gruppe identifizierten, als gegenüber Mitgliedern, bei denen das weniger der Fall war.
3 Die wechselseitige Wertschätzung der Mitglieder ist grösser in kohäsiveren als in weniger kohäsiven Gruppen.
4 Mitglieder kohäsiverer Gruppen schätzten die Beurteilung anderer Mitglieder über sie als Kollegen genauer ein als Mitglieder weniger kohäsiver Gruppen.
5 In kohäsiveren Gruppen wurden weniger Personen durch Mitglieder der eigenen Gruppen abgelehnt.
6 Kohäsivere Gruppen zeichneten sich durch eine zentralisiertere Wahl-Struktur aus.
7 In kohäsiveren Gruppen war die Cliquenbildung geringer.
Der statistische Beweis des letzten Punktes konnte nicht vollständig erbracht werden.
Während die obengenannten Hypothesen durch unsere Untersuchungen gestützt wurden, ist dies bei einigen anderen nicht der Fall. Wir hatten zum Beispiel angenommen, dass Mitglieder, die sich in hohem Masse mit ihrer Gruppe identifizierten, gegenüber gleichgesinnten derselben Gruppe erhöhte Verständigungsbereitschaft zeigen und die anderen als Mitarbeiter vorziehen würden. Diese Voraussage wurde durch unsere Ergebnisse nicht bestätigt. Ferner wurde die Hypothese nicht bestätigt, dass innerhalb einer kohäsiveren Gruppe die Übereinstimmung im Hinblick auf die Beurteilung des relativen Vermögens zur Zusammenarbeit grösser sein würde als bei einer weniger kohäsiven. Mögliche Erklärungen für diese negativen Resultate werden diskutiert.

**Appendix I. Experimental instructions employed with and the contents of the cohesion questionnaire as utilized in the measurement of the cohesion level in both the pilot study and the experiment proper. English translation in parentheses.**[1]

Hoe aantrekkelijk vindt U deze groep waarvan U deel uitmaakt? (U kunt dit aangeven door een vertikaal streepje te plaatsen op onderstaande schaal, waarvan we de uiteinden hebben omschreven en waarvan het midden, het indifferente punt, is aangegeven door een stippellijntje.)
How attractive is your group to you? (You can give your answer to this question by placing a vertical line on the scale below the question. We have indicated the boundaries of the scale and the dotted line in the middle indicates a point of neutrality.)

(1) zeer aantrekkelijk ——— zeer onaantrekkelijk
very attractive ——— very unattractive [2]

(2) [3] * Streep nu uit onderstaande motievenlijst die motieven aan waardoor U deze groep min of meer aantrekkelijk vindt. In de hokjes een kruisje plaatsen indien dit motief voor U geldt en een horizontaal streepje bij die motieven die niet voor U gelden.
(Indicate which motives from the following list of motives served as reasons for you to find your group more or less attractive. If a motive serves as a reason for finding your group attractive place a cross in the square to the left of it. If it does not, then place a horizontal line in the square.)

Ik vind deze groep aantrekkelijk:
(I think this group is attractive:)

☐ 1 omdat er prettige mensen in deze groep zitten.
(because the members of this group are pleasant people.)
☐ 2 omdat je veel leert uit de geboden stof; alles bij elkaar is het nuttig voor mijn werk.
(because you learn a lot from the material presented; it is of value to me in my work.)
☐ 3 omdat je veel leert van elkaar.
(because you learn a lot from one another.)
☐ 4 omdat je meer contacten krijgt buiten je eigen afdeling.
(because you have the opportunity for meeting people from other departments.)
☐ 5 omdat het wel gezellig is.
(because there is a congenial atmosphere.)
☐ 6 omdat het prettig is ergens bij te horen.
(because it's pleasant to belong to things.)

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[1] Dutch translation by Mr. J. L'Ortye. No English appeared on the questionnaire as presented the subjects.
[2] Similar scales appeared under all questions excluding question two. We will in further illustrations only list the bi-polar words at the ends of these scales.
[3] The reader will remember that some items in the cohesion questionnaire were, as a result of pilot study analyses, dropped from the cohesion test. These items from the total questionnaire were, therefore, not employed in the measurement of the cohesion levels of groups in the experiment proper. These five items are indicated by an asterisk.

☐ 7 omdat het een goede groep is, beter dan de andere kadervormingsgroepen.
(because it's a good group, better than other leadership training groups.)

☐ 8 omdat het wat betekent dat je uitverkoren bent voor zo'n groep.
(because it's a distinction to be selected (for participation) in such a group.)

☐ 9 omdat je de mogelijkheid hebt om individueel op te vallen.
(because you have a chance to make an impression, to stand out on your own.)

☐ 10 omdat het een prettige onderbreking is van je werk, van de dagelijkse sleur.
(because it's a pleasant change from your usual job, from the same old grind.)

☐ 11 omdat je er veel mensenkennis opdoet.
(because you learn a lot about people.)

☐ 12 omdat wat er verteld wordt, interessant is.
(because what you get to hear is interesting.)

☐ 13 omdat het vrije contact vooral in de pauze, tijdens maaltijden en koffie zo prettig is.
(because causal contact during intermission, meals, and coffee breaks is very pleasant.)

☐ 14 omdat je dit volgens de bedrijfsleiding meegemaakt moet hebben om een hogere functie te bekleden.
(because according to the leaders of this industry you have to have had this training to be chosen for a better position.)

☐ 15 omdat de chef dit belangrijk vindt, dus omdat ik er heen moet.
(because my boss thinks it's important, i.e., because I have to go.)

☐ 16 omdat je hier even tot rust komt na dat drukke werk.
(because you get the chance to just take it easy after all that hard work.)

☐ 17 omdat ik graag discussieer over allerlei onderwerpen.
(because I like to talk about all sorts of subjects.)

☐ 18 omdat ik graag veel wil leren op allerlei gebied.
(because I am interested in learning about a lot of different things.)

☐ 19 omdat ik enige lui uit deze groep al langer persoonlijk ken.
(because I already knew some of the guys from this group.)

☐ 20 omdat ik het noodzakelijk vind voor het bedrijf.
(because I think it's important for this plant.)

☐ 21 omdat de meeste inleiders het goed doen.
(because most discussion moderators do a good job.)

☐ 22 omdat je hier je zelf kunt zijn.
(because you can just be yourself here)

☐ 23 omdat je door deze cursus een betere chef kunt worden.
(because you can become a better boss through this course.)

☐ 24 omdat de groep juist groot (of klein) genoeg is naar mijn zin.
(because the group is just large (or small) enough to meet my taste.)

☐ 25 omdat het me bevalt dat je hier vrijuit mag praten.
(because I like the idea that one can speak his mind here.)

☐ 26 omdat er geen strenge leiding is.
(because there is no authoritarian leadership here.)

(3) Wilt U graag lid blijven van deze groep?
(Would you like to stay a member of this group?)

ja zeker — zeker niet
yes, certainly — certainly not

(4) Als U het voor het zeggen had, hoe vaak zou deze groep dan bij elkaar komen?
(If it were up to you how often would this group meet?)

dikwijls — slechts weinig
often — quite infrequently

(5) Als er een andere cursus of een werkgroep moest worden gestart, wilde U dan, indien U de mensen mocht kiezen, weer met de mensen van deze groep daarin zitten?
(If another course or work group were to begin, would you choose the same people for that group as are in this one if you could do the choosing?)

ja zeker — zeker niet
yes, certainly — certainly not

(6) Zoudt U een vriend aanraden in deze groep te komen, indien dit nog mogelijk zou zijn?
(Would you advise a friend to join this group if it were possible?)

ja zeker — zeker niet
yes, certainly — certainly not

(7) Tonen de mensen in uw Kadervormingsgroep veel belangstelling voor de inzichten van anderen in de groep?
(Do the people in your group show interest in the viewpoint of others in the group?)

ja zeker — zeker niet
yes, certainly — certainly not

(8) Denkt U dat de mensen in uw Kadervormingsgroep dezelfde opvatting hebben over het doel van deze bijeenkomsten?
(In your opinion, do the people in your group have the same conception of the purpose of these conferences?)

ja zeker — zeker niet
yes, certainly — certainly not

(9) Zouden de meeste mensen in uw Kadervormingsgroep bereid zijn vrijwillig extra-ongemakken te accepteren als zij de groep hiermee konden helpen?
(Would most of the people in your leadership training group be willing to accept additional work in the group's behalf if this would help the group?)

ja zeker — zeker niet
yes, certainly — certainly not

(10) Als mensen van andere groepen uw groep zouden bekritiseren of kleineren zouden de meeste mensen van uw groep hun dan tegenspreken en uw groep verdedigen?
(If people from other groups were to criticize or belittle your group, would most of the people from your group contradict them and defend your group?)

ja zeker — zeker niet
yes, certainly — certainly not

(11) Hebben de meeste mensen hier in de groep dezelfde mening over het doel van deze groepen?
(Do most of the people from the group have the same opinion of the purpose of these groups?)

ja zeker — zeker niet
yes, certainly — certainly not

(12) * Zouden de meeste mensen van deze groep het op prijs stellen als zij buiten diensttijd elkaar eens zouden ontmoeten?
(Would most of the people in this group find it worthwhile to meet each other after hours?)
ja zeker — zeker niet
yes, certainly — certainly not

(13) De meeste mensen van deze groep denken hetzelfde over de inleiders?
(Most people in this group have the same opinion of the moderators?)
ja zeker — zeker niet
yes, certainly — certainly not

(14) Wanneer uw groep op eigen houtje enkele regels zou opstellen, zouden de meeste mensen zich dan graag daaraan houden?
(If your group should make up several rules on its own authority, would most people gladly observe them?)
ja zeker — zeker niet
yes, certainly — certainly not

(15) * Zouden de meeste mensen van uw groep het er mee eens zijn dat iemand die zo'n regel overtreedt, hierover zou worden aangesproken?
(Would most people in your group be in agreement that someone who broke such a rule should be criticized for it?)
ja zeker — zeker niet
yes, certainly — certainly not

(16) Als in uw groep iets beslist moet worden, houden de meeste mensen dan rekening met de mening van de anderen?
(If something has to be decided in your group, do most of the people weigh the opinions of others in the group?)
ja zeker — zeker niet
yes, certainly — certainly not

(17) * Hebben de meeste mensen in uw groep het gevoel dat uw groep beter zou kunnen zijn?
(Do most members of your group have the opinion that your group could be better?)
ja zeker — zeker niet
yes, certainly — certainly not

(18) * Wordt je in dit bedrijf voor voller aangezien als je kadervorming hebt gehad?
(Are you considered more competent (by the people in) this plant if you have had leadership training?)
ja zeker — zeker niet
yes, certainly — certainly not

(19) Is het belangrijker voor de meeste mensen in de groep om tot een betere groepsdiscussie te komen dan om zelf op hun eentje uit te blinken?
(Is it more important for most of the people in the group to achieve a better group discussion than to score points on their own?)
ja zeker — zeker niet
yes, certainly — certainly not

(20) De meeste mensen in mijn groep hebben in de gaten dat ze tot een heel gezellige groep behoren.
(Most people in my group are aware that they belong to a very congenial group.) ja zeker — zeker niet
yes, certainly — certainly not

(21) Het kadervormingswerk in onze groep zal succes hebben.
(Our group will be successful in handling the tasks of this leadership training program.)

ja zeker — zeker niet
yes, certainly certainly not

(22) De meeste mensen in mijn groep zijn het er over eens dat deze cursus de moeite waard is.
(Most people in my group are agreed that this program is worthwhile.)

ja zeker — zeker niet
yes, certainly certainly not

**Appendix II.1. Individual scores on the cohesion test for subjects in the pilot study experimental group for separate administrations of the test at four time periods in the group's existence.[4]**

| *Administration* | *Fourth Week* | *Thirteenth* | *Twenty-third* | *Thirty-third* |
|---|---|---|---|---|
| Subject 1. | 989 | 1110 | 979 | 987 |
| 2. | 784 | 998 | 1027 | 1060 |
| 3. | 639 | 665 | 671 | 767 |
| 4. | 591 | 651 | 942 | |
| 5. | 989 | 970 | | |
| 6. | 1048 | 1059 | 1078 | 1104 |
| 7. | | 931 | 1007 | 788 |
| 8. | 818 | 943 | 1041 | 925 |
| 9. | 1085 | 1108 | 1111 | 951 |
| 10. | 813 | 794 | 892 | 833 |
| 11. | 795 | 891 | 895 | 800 |
| 12. | | 963 | 1010 | 634 |
| 13. | 551 | 761 | 928 | 966 |
| 14. | 651 | 761 | 1007 | 860 |
| 15. | 722 | 885 | 938 | 1033 |

**Appendix II.2. Individual scores on the cohesion test for subjects in the pilot study control group for separate administrations of the test at four time periods in the group's existence[5].**

| *Administration* | *Fourth Week* | | *Thirteenth* | | *Twenty-third* | | *Thirty-third* | |
|---|---|---|---|---|---|---|---|---|
| Group | 1[6] | 2[7] | 1 | 2 | 1 | 2 | 1 | 2 |
| Subject 1. | 907 | 1061 | 879 | | 663 | | 729 | |
| 2. | 857 | 688 | 766 | 748 | 930 | 849 | 952 | 888 |
| 3. | 941 | 842 | 954 | 791 | 860 | 700 | 825 | 755 |
| 4. | 898 | 792 | 638 | | | 696 | 724 | 659 |
| 5 | | 704 | | 681 | 944 | 641 | 727 | 711 |
| 6. | 632 | 767 | 841 | 801 | 851 | 767 | 881 | 905 |
| 7. | 657 | 738 | 495 | 555 | 611 | 596 | 648 | 810 |
| 8. | | 802 | | 890 | | | | 906 |
| 9. | 796 | 860 | 852 | 963 | | | 638 | 919 |
| 10. | 821 | | 952 | 672 | 801 | 619 | 885 | 732 |
| 11. | 712 | | 770 | 933 | | 664 | 714 | 755 |
| 12. | 448 | 691 | | 569 | 724 | 431 | 702 | 595 |
| 13. | 589 | 649 | | 672 | 676 | | 596 | |
| 14. | 933 | 779 | 1083 | 976 | | | | 984 |
| 15. | 797 | 681 | 786 | | 740 | | 778 | |
| 16. | | 938 | | 979 | | | | 642 |

[4] Not all subjects in the group were present at all administrations as can be seen from the table.
[5] Not all subjects were present at each administration as can be seen from the table.
[6] Engineers' group.
[7] Lower administrative personnel's group

**Appendix III. Experimental instructions employed with and the list of reasons for group membership presented subjects in the nine separate groups from the experiment proper. English translation in parentheses.**

Welke van de volgende redenen was voor U persoonlijk de meest belangrijke reden tot deze groep te behoren? Plaats een *1* naast de meest belangrijke; een *2* naast de in belangrijkheid hierop volgende enz.
(Which of the following reasons was for you personally the most important reason for belonging to this group? Place a *1* next to the most important reason; a *2* beside the second most important, etc.)

1 [8] Omdat je veel leert uit de geboden stof, alles bij elkaar is het nuttig voor mijn werk.
(See question 2, number 2, Appendix I.)
2 Omdat je veel leert van elkaar.
(See question 2, number 3, Appendix I.)
3 Omdat je meer contacten krijgt buiten je eigen afdeling.
(See question 2, number 4, Appendix I.)
4 Omdat wat er verteld wordt, interessant is.
(See question 2, number 12, Appendix I.)
5 Omdat ik graag veel wil leren op allerlei gebied.
(See question 2, number 18, Appendix I.)
6 Omdat er prettige mensen in deze groep zitten.
(See question 2, number 1, Appendix I.)
7 Omdat je er veel mensenkennis opdoet.
(See question 2, number 11, Appendix I.)
8 Omdat ik het noodzakelijk vind voor het bedrijf.
(See question 2, number 20, Appendix I.)
9 Omdat ik graag discussieer over allerlei onderwerpen.
(See question 2, number 17, Appendix I.)
10 Omdat je door deze cursus een betere Chef kunt worden.
(See question 2, number 23, Appendix I.)

[8] Numbers did not appear on the material as presented the subjects.

**Appendix IV.1. Experimental instructions employed with and the list of group tasks presented subjects in the two lower administrative personnel groups from the experiment proper. English translation in parentheses.**

Als U de volgende onderwerpen die in deze groep worden behandeld, moest rangschikken, welke onderwerpen dacht U dan voor U persoonlijk van het meeste belang te zijn?
(If you had to rank order the following subjects that were handled in this group, which subjects would you say were most important to you personally?)

1 [9] Samenwerking (bouwpakket).
(Teamwork (building assembly set))[10]
2 Aspecten van leiding geven.
(Aspects of exercising leadership.)
3 Vrije groepsgesprekken.
(Non-specific group discussions.)
4 Resultaten van enquete.
(Reports over investigations done in the industry.)
5 Praktijkgevallen.
(Concrete cases from critical incidents in industry.)
6 Arbeidsvoorwaarden van arbeiders.
(Work regulations for hourly paid personnel.)
7 Industriële ontwikkeling en ontwikkeling van het bedrijfsleven.
(The development of industry and of plant life.)
8 Bedrijfspsycholoog.
(The job of the industrial psychologist.)
9 Veiligheid.
(Safety.)
10 De taak van de Chef.
(The supervisory function.)
11 Communicatie.
(Communication.)
12 Technische herziening arbeidsvoorwaarden van beambten.
(Revision in the technical work regulations for white collar workers.)

[9] Numbers did not appear on subjects' material.
[10] This referred to a task performed in the group in which the subjects had to co-operate in building a miniature project.

**Appendix IV.2. Experimental instructions employed with and the list of group tasks presented subjects in the four groups of hourly paid personnel from the experiment proper. English translation in parentheses.**

1 Taak van de baas.
(The foreman's function.)
2 Arbeidsvoorwaarden.
(Work regulations for hourly paid personnel.)
3 Taak van de bedrijfspsycholoog.
(Task of the industrial psychologist.)
4 Ontwikkeling van het bedrijfsleven.
(Development of life in the industrial plant.)
5 Groepsgesprekken.
(Group discussions.)
6 Veiligheidsdienst.
(The safety department.)
7 Verantwoordelijkheid, bevoegdheid, en delegeren.
(Responsibility, competence, and delegation.)
8 Praktijkgevallen.
(Critical incident cases.)
9 Het beoordelen.
(Evaluation-rating.)
10 Werkinstructie.
(Work instruction.)
11 Personeel en loonadministratie.
(Administration of personnel and remuneration.)
12 Prijsvraag „Interesse in het werk en het bedrijf."
(Competition: "Interest in one's work and the plant.")

**Appendix V. Experimental instructions employed with and a hypothetical illustration of the type of communication measure employed to obtain communication data on subjects in the nine groups from the experiment proper. English translation in parentheses.**

Geeft U nu eens met een streepje op de volgende lijnen aan hoe dikwijls U denkt dat de genoemde persoon gedurende deze cursus het woord heeft gericht tot U. (Please indicate how often you feel you were communicated to by the subject in question by placing a mark upon the following lines.)

| | | | |
|---|---|---|---|
| Smith | vaak | | helemaal niet |
| | often | | not at all |
| Jones | vaak | | helemaal niet |
| | often | | not at all |
| Roberts | vaak | | helemaal niet |
| | often | | not at all |
| Richards | vaak | | helemaal niet |
| | often | | not at all |
| Allen | vaak | | helemaal niet |
| | often | | not at all |

These names are, of course, fictitious. We can illustrate our method of measuring communication by assuming that a certain subject Smith is a member of a group including the four other subjects whose names appear as above. Communication data on Smith were obtained by having him underline the scale next to his own name and then having him fill in the remaining four scales to his liking.
The subject was informed verbally that the dotted line indicated average communication received from the other in question.

**Appendix VI. Individual scores (adhesion scores) on the cohesion test for subjects in the nine groups from the experiment proper.**

| *Group* | | *I* | *II* | *III* | *IV* |
|---|---|---|---|---|---|
| Sub- | 1. | 991[11] | 845[12] | 823 | 980 |
| ject | 2. | 596[12] | 860[12] | 906 | 1012[11] |
| | 3. | 778 | 980 | 936 | 912 |
| | 4. | 938[11] | 1028 | 906 | 932 |
| | 5. | 868 | 894 | 1037[11] | 880 |
| | 6. | 776 | 1033[11] | 871 | 876 |
| | 7. | 888 | 1033[11] | 1005[11] | 988[11] |
| | 8. | 817 | 1062[11] | 863 | 694[12] |
| | 9. | 669[12] | 881 | 718[12] | 913 |
| | 10. | 1097[11] | 1030 | 1070[11] | 1175[11] |
| | 11. | 785 | 990 | 743[12] | 782[12] |
| | 12. | 807 | 762[12] | 717[12] | 948 |
| | 13. | 815 | | | 841[12] |
| | 14. | 763[12] | | | |
| | 15. | 474[12] | | | |
| | 16. | 997[11] | | | |

| Group | | *V* | *VI* | *VII* | *VIII* | *IX* |
|---|---|---|---|---|---|---|
| Sub- | 1. | 859 | 646[12] | 1109[11] | 1077[11] | 928 |
| ject | 2. | 799[12] | 880 | 1049[11] | 1176[11] | 957 |
| | 3. | 1058[11] | 906[11] | 1016 | 887 | 1063[11] |
| | 4. | 919 | 840 | 873[12] | 757[12] | 752 |
| | 5. | 947 | 781 | 1113[11] | 931 | 934 |
| | 6. | 1052[11] | 753[12] | 1048 | 860 | 1064[11] |
| | 7, | 676[12] | 926[11] | 918 | 792[12] | 567[12] |
| | 8. | 967 | 756 | 888[12] | 906 | 890 |
| | 9. | 979 | 875 | 817[12] | 827 | 1027 |
| | 10. | 1045 | 1012[11] | 1009 | 1025[11] | 672[12] |
| | 11. | 950 | 887 | 997 | 567[12] | |
| | 12. | 820 | 821 | 743[12] | | |
| | 13. | 1117[11] | 740[12] | 947 | | |
| | 14. | 701[12] | | 1114[11] | | |
| | 15. | | | 1045 | | |
| | 16. | | | 916 | | |

[11] More-adhesive subjects.
[12] Less-adhesive subjects.

**Appendix VII. Data obtained from individual rank orderings of the relative importance to the rating subject of the ten reasons for group membership by subjects in the nine experimental groups.**

Appendix VII.1

*Reasons for group membership*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8 | 6 | 3 | 7 | 1 | 5 | 4 | 9 | 10 | 2 |
| 2 | 6 | 4 | 1 | 3 | 7 | 5 | 9 | 10 | 2 | 8 |
| 3 | 8 | 2 | 10 | 9 | 4 | 6 | 7 | 1 | 5 | 3 |
| 4 | 1 | 5 | 3 | 9 | 8 | 7 | 4 | 2 | 10 | 6 |
| 5 | 1 | 6 | 5 | 4 | 9 | 8 | 3 | 10 | 7 | 2 |
| 6 | 5 | 2 | 1 | 8 | 4 | 7 | 6 | 10 | 3 | 9 |
| 7 | 3 | 6 | 5 | 9 | 8 | 10 | 7 | 2 | 4 | 1 |
| 8 | 2 | 1 | 6 | 3 | 7 | 5 | 4 | 9 | 10 | 8 |
| 9 | 8 | 4 | 2 | 9 | 6 | 1 | 5 | 7 | 10 | 3 |
| 10 | 3 | 5 | 2 | 8 | 4 | 10 | 9 | 6 | 7 | 1 |
| 11 | 8 | 4 | 2 | 7 | 3 | 6 | 1 | 10 | 5 | 9 |
| 12 | 6 | 5 | 1 | 9 | 2 | 4 | 7 | 10 | 3 | 8 |
| 13 | 9 | 5 | 6 | 10 | 1 | 3 | 2 | 8 | 4 | 7 |
| 14 | 1 | 5 | 6 | 3 | 2 | 4 | 8 | 9 | 7 | 10 |
| 15 | 7 | 4 | 3 | 1 | 5 | 9 | 6 | 10 | 2 | 8 |
| 16 | 2 | 9 | 8 | 4 | 6 | 7 | 3 | 5 | 10 | 1 |
| | 78 | 73 | 64 | 103 | 77 | 97 | 85 | 118 | 99 | 86 |

Appendix VII.2

*Reasons for group membership*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 9 | 3 | 5 | 6 | 8 | 4 | 7 | 10 | 2 |
| 2 | 4 | 5 | 6 | 8 | 3 | 10 | 7 | 2 | 9 | 1 |
| 3 | 1 | 6 | 3 | 8 | 2 | 10 | 7 | 5 | 9 | 4 |
| 4 | 1 | 6 | 7 | 3 | 4 | 2 | 5 | 8 | 9 | 10 |
| 5 | 2 | 5 | 3 | 6 | 7 | 9 | 4 | 8 | 10 | 1 |
| 6 | 7 | 1 | 3 | 6 | 8 | 10 | 5 | 2 | 9 | 4 |
| 7 | 1 | 3 | 6 | 7 | 4 | 10 | 9 | 5 | 8 | 2 |
| 8 | 6 | 1 | 3 | 9 | 8 | 10 | 2 | 4 | 5 | 7 |
| 9 | 1 | 3 | 10 | 8 | 2 | 9 | 6 | 4 | 5 | 7 |
| 10 | 3 | 5 | 8 | 9 | 4 | 10 | 6 | 2 | 7 | 1 |
| 11 | 1 | 4 | 9 | 5 | 7 | 10 | 3 | 8 | 6 | 2 |
| 12 | 2 | 5 | 10 | 4 | 1 | 8 | 7 | 9 | 6 | 3 |
| | 30 | 53 | 71 | 78 | 56 | 106 | 65 | 64 | 93 | 44 |

Appendix VII.3

*Reasons for group membership*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 5 | 4 | 2 | 9 | 1 | 10 | 3 | 8 | 6 | 7 |
| **2** | 1 | 2 | 5 | 6 | 7 | 10 | 4 | 8 | 9 | 3 |
| **3** | 1 | 8 | 6 | 5 | 4 | 10 | 3 | 7 | 9 | 2 |
| **4** | 1 | 7 | 8 | 9 | 4 | 10 | 5 | 2 | 6 | 3 |
| **5** | 2 | 5 | 8 | 9 | 3 | 10 | 4 | 7 | 6 | 1 |
| **6** | 3 | 9 | 7 | 6 | 1 | 8 | 4 | 5 | 10 | 2 |
| **7** | 3 | 5 | 4 | 8 | 10 | 9 | 2 | 6 | 7 | 1 |
| **8** | 1 | 2 | 6 | 5 | 7 | 9 | 3 | 4 | 8 | 10 |
| **9** | 2 | 9 | 6 | 5 | 3 | 10 | 4 | 7 | 8 | 1 |
| **10** | 3 | 6 | 10 | 8 | 5 | 9 | 4 | 2 | 7 | 1 |
| **11** | 5 | 6 | 10 | 4 | 1 | 9 | 7 | 3 | 2 | 8 |
| **12** | 5 | 4 | 2 | 7 | 3 | 9 | 1 | 6 | 8 | 10 |
| | 32 | 67 | 74 | 81 | 49 | 113 | 44 | 65 | 86 | 49 |

Appendix VII.4

*Reasons for group membership*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 1 | 2 | 4 | 5 | 7 | 9 | 6 | 8 | 10 | 3 |
| **2** | 1 | 8 | 5 | 6 | 3 | 9 | 10 | 4 | 7 | 2 |
| **3** | 3 | 1 | 5 | 9 | 6 | 10 | 8 | 4 | 7 | 2 |
| **4** | 2 | 4 | 1 | 5 | 6 | 7 | 10 | 8 | 9 | 3 |
| **5** | 1 | 5 | 8 | 3 | 6 | 10 | 7 | 9 | 4 | 2 |
| **6** | 7 | 9 | 1 | 6 | 5 | 10 | 8 | 2 | 4 | 3 |
| **7** | 1 | 7 | 8 | 6 | 2 | 9 | 3 | 4 | 10 | 5 |
| **8** | 4 | 7 | 8 | 6 | 2 | 9 | 3 | 5 | 10 | 1 |
| **9** | 1 | 3 | 2 | 6 | 8 | 10 | 7 | 4 | 9 | 5 |
| **10** | 2 | 5 | 6 | 9 | 4 | 10 | 7 | 3 | 8 | 1 |
| **11** | 3 | 4 | 6 | 5 | 2 | 10 | 9 | 7 | 8 | 1 |
| **12** | 1 | 8 | 9 | 6 | 3 | 10 | 7 | 2 | 5 | 4 |
| **13** | 4 | 5 | 7 | 8 | 1 | 10 | 6 | 3 | 9 | 2 |
| | 31 | 68 | 70 | 80 | 55 | 123 | 91 | 63 | 100 | 34 |

Appendix VII.5

*Reasons for group membership*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 8 | 4 | 6 | 9 | 2 | 7 | 3 | 5 | 10 | 1 |
| **2** | 7 | 1 | 4 | 10 | 3 | 9 | 2 | 8 | 5 | 6 |
| **3** | 3 | 7 | 9 | 2 | 4 | 6 | 1 | 8 | 5 | 10 |
| **4** | 9 | 4 | 6 | 10 | 8 | 2 | 1 | 5 | 3 | 7 |
| **5** | 1 | 6 | 4 | 5 | 2 | 9 | 3 | 7 | 10 | 8 |
| **6** | 3 | 6 | 4 | 7 | 1 | 8 | 9 | 2 | 10 | 5 |
| **7** | 7 | 3 | 2 | 6 | 10 | 8 | 1 | 5 | 4 | 9 |
| **8** | 1 | 7 | 4 | 5 | 8 | 2 | 3 | 9 | 6 | 10 |
| **9** | 7 | 5 | 6 | 8 | 1 | 9 | 3 | 4 | 10 | 2 |
| **10** | 1 | 8 | 6 | 3 | 5 | 4 | 9 | 10 | 7 | 2 |
| **11** | 1 | 9 | 5 | 2 | 8 | 10 | 6 | 4 | 7 | 3 |
| **12** | 1 | 8 | 6 | 5 | 4 | 2 | 9 | 10 | 3 | 7 |
| **13** | 4 | 6 | 7 | 8 | 3 | 10 | 1 | 2 | 9 | 5 |
| **14** | 1 | 6 | 2 | 4 | 7 | 3 | 5 | 9 | 10 | 8 |
| | 54 | 80 | 71 | 84 | 66 | 89 | 56 | 88 | 99 | 83 |

Appendix VII.6

*Reasons for group membership*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 4 | 7 | 5 | 3 | 1 | 8 | 9 | 2 | 6 | 10 |
| **2** | 4 | 6 | 1 | 5 | 3 | 2 | 9 | 7 | 8 | 10 |
| **3** | 8 | 5 | 2 | 10 | 4 | 6 | 1 | 9 | 3 | 7 |
| **4** | 5 | 3 | 1 | 4 | 6 | 2 | 7 | 9 | 8 | 10 |
| **5** | 3 | 9 | 10 | 1 | 4 | 6 | 5 | 8 | 2 | 7 |
| **6** | 4 | 2 | 1 | 5 | 7 | 3 | 6 | 10 | 9 | 8 |
| **7** | 6 | 3 | 1 | 7 | 5 | 9 | 2 | 8 | 4 | 10 |
| **8** | 1 | 2 | 7 | 4 | 8 | 3 | 9 | 5 | 10 | 6 |
| **9** | 3 | 5 | 6 | 2 | 8 | 4 | 9 | 10 | 1 | 7 |
| **10** | 1 | 3 | 6 | 4 | 9 | 10 | 8 | 2 | 7 | 5 |
| **11** | 3 | 5 | 2 | 6 | 8 | 10 | 7 | 1 | 4 | 9 |
| **12** | 2 | 7 | 5 | 1 | 4 | 10 | 9 | 8 | 3 | 6 |
| **13** | 8 | 3 | 9 | 10 | 5 | 7 | 2 | 6 | 1 | 4 |
| | 52 | 60 | 56 | 62 | 72 | 80 | 83 | 85 | 66 | 99 |

Appendix VII.7

*Reasons for group membership*

| *Subject* | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 1 | 4 | 10 | 6 | 7 | 2 | 9 | 8 | 5 | 3 |
| **2** | 8 | 7 | 10 | 9 | 1 | 5 | 3 | 2 | 6 | 4 |
| **3** | 8 | 6 | 3 | 7 | 5 | 2 | 4 | 9 | 1 | 10 |
| **4** | 7 | 1 | 8 | 10 | 3 | 9 | 2 | 6 | 4 | 5 |
| **5** | 4 | 1 | 5 | 9 | 7 | 8 | 2 | 6 | 10 | 3 |
| **6** | 1 | 2 | 9 | 7 | 4 | 5 | 10 | 6 | 8 | 3 |
| **7** | 9 | 2 | 10 | 5 | 6 | 4 | 1 | 7 | 3 | 8 |
| **8** | 2 | 8 | 3 | 4 | 6 | 10 | 1 | 7 | 5 | 9 |
| **9** | 2 | 8 | 6 | 5 | 7 | 10 | 3 | 4 | 9 | 1 |
| **10** | 6 | 2 | 5 | 9 | 3 | 4 | 7 | 1 | 8 | 10 |
| **11** | 5 | 7 | 9 | 4 | 1 | 8 | 3 | 6 | 10 | 2 |
| **12** | 5 | 6 | 9 | 4 | 1 | 7 | 3 | 10 | 2 | 8 |
| **13** | 2 | 3 | 4 | 5 | 9 | 7 | 1 | 8 | 10 | 6 |
| **14** | 3 | 5 | 6 | 9 | 10 | 7 | 4 | 1 | 8 | 2 |
| **15** | 1 | 9 | 10 | 3 | 4 | 2 | 5 | 7 | 8 | 6 |
| **16** | 7 | 3 | 8 | 9 | 6 | 1 | 2 | 4 | 10 | 5 |
| | 71 | 74 | 115 | 105 | 80 | 91 | 60 | 92 | 107 | 85 |

Appendix VII.8

*Reasons for group membership*

| *Subject* | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 9 | 1 | 7 | 6 | 3 | 4 | 2 | 10 | 5 | 8 |
| **2** | 10 | 5 | 7 | 2 | 9 | 6 | 4 | 3 | 8 | 1 |
| **3** | 6 | 4 | 7 | 5 | 1 | 8 | 3 | 10 | 2 | 9 |
| **4** | 3 | 4 | 6 | 9 | 5 | 10 | 2 | 7 | 8 | 1 |
| **5** | 1 | 7 | 9 | 6 | 4 | 5 | 3 | 10 | 8 | 2 |
| **6** | 6 | 4 | 9 | 10 | 5 | 7 | 3 | 2 | 8 | 1 |
| **7** | 3 | 7 | 9 | 2 | 5 | 6 | 1 | 8 | 4 | 10 |
| **8** | 9 | 4 | 3 | 10 | 8 | 5 | 2 | 7 | 1 | 6 |
| **9** | 4 | 6 | 7 | 8 | 5 | 10 | 3 | 2 | 9 | 1 |
| **10** | 5 | 8 | 7 | 3 | 2 | 9 | 1 | 10 | 4 | 6 |
| **11** | 7 | 10 | 3 | 5 | 6 | 8 | 9 | 1 | 4 | 2 |
| | 63 | 60 | 74 | 66 | 53 | 78 | 33 | 70 | 61 | 47 |

Appendix VII.9

*Reasons for group membership*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 6 | 2 | 10 | 5 | 4 | 8 | 1 | 9 | 3 | 7 |
| **2** | 2 | 10 | 9 | 4 | 1 | 7 | 5 | 6 | 8 | 3 |
| **3** | 3 | 5 | 6 | 8 | 10 | 7 | 4 | 1 | 9 | 2 |
| **4** | 1 | 8 | 7 | 5 | 3 | 10 | 6 | 4 | 9 | 2 |
| **5** | 4 | 2 | 8 | 3 | 6 | 7 | 5 | 10 | 1 | 9 |
| **6** | 2 | 4 | 6 | 9 | 3 | 10 | 5 | 8 | 7 | 1 |
| **7** | 4 | 2 | 6 | 3 | 7 | 8 | 1 | 5 | 10 | 9 |
| **8** | 6 | 4 | 8 | 7 | 2 | 3 | 1 | 9 | 5 | 10 |
| **9** | 1 | 6 | 10 | 5 | 4 | 8 | 2 | 7 | 9 | 3 |
| **10** | 4 | 5 | 7 | 3 | 1 | 10 | 2 | 9 | 6 | 8 |
| | 33 | 48 | 77 | 52 | 41 | 78 | 32 | 68 | 67 | 54 |

**Appendix VIII. Data obtained from individual rank orderings of the relative importance to the rating subject of the twelve group tasks by subjects in six of the nine groups from the experiment proper.**

Appendix VIII.1

*Task*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 1 | 2 | 7 | 11 | 9 | 8 | 4 | 6 | 10 | 5 | 3 | 12 |
| **1** | 9 | 6 | 1 | 12 | 4 | 11 | 8 | 3 | 2 | 10 | 7 | 5 |
| **3** | 7 | 2 | 4 | 3 | 5 | 11 | 12 | 9 | 10 | 8 | 1 | 6 |
| **4** | 10 | 1 | 8 | 9 | 7 | 6 | 12 | 3 | 11 | 2 | 4 | 5 |
| **5** | 2 | 1 | 6 | 9 | 7 | 10 | 4 | 8 | 12 | 5 | 3 | 11 |
| **6** | 12 | 3 | 7 | 6 | 11 | 4 | 10 | 9 | 5 | 1 | 8 | 2 |
| **7** | 9 | 4 | 10 | 11 | 12 | 7 | 8 | 1 | 6 | 2 | 3 | 5 |
| **8** | 9 | 5 | 3 | 2 | 4 | 8 | 12 | 1 | 11 | 6 | 7 | 10 |
| **9** | 6 | 1 | 11 | 5 | 10 | 12 | 7 | 9 | 3 | 4 | 8 | 2 |
| **10** | 4 | 5 | 2 | 12 | 6 | 10 | 7 | 1 | 9 | 3 | 11 | 8 |
| **11** | 6 | 9 | 4 | 12 | 7 | 3 | 11 | 10 | 2 | 5 | 1 | 8 |
| **12** | 10 | 9 | 1 | 8 | 2 | 6 | 12 | 4 | 3 | 7 | 5 | 11 |
| **13** | 4 | 1 | 2 | 12 | 5 | 8 | 10 | 9 | 11 | 3 | 6 | 7 |
| **14** | 2 | 5 | 11 | 9 | 12 | 7 | 3 | 8 | 4 | 6 | 1 | 10 |
| **15** | 10 | 3 | 2 | 11 | 12 | 6 | 7 | 9 | 1 | 4 | 5 | 8 |
| **16** | 10 | 2 | 7 | 11 | 6 | 4 | 9 | 8 | 12 | 1 | 3 | 5 |
| | 111 | 59 | 86 | 143 | 119 | 121 | 136 | 98 | 112 | 72 | 76 | 115 |

Appendix VIII.2

*Task*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 1 | 3 | 10 | 4 | 5 | 9 | 2 | 8 | 6 | 7 | 11 | 12 |
| **2** | 1 | 4 | 10 | 12 | 6 | 5 | 3 | 7 | 2 | 8 | 9 | 11 |
| **3** | 3 | 4 | 11 | 8 | 6 | 1 | 2 | 12 | 5 | 7 | 9 | 10 |
| **4** | 1 | 2 | 8 | 11 | 9 | 7 | 4 | 3 | 10 | 5 | 6 | 12 |
| **5** | 1 | 7 | 9 | 11 | 6 | 5 | 3 | 4 | 2 | 8 | 12 | 10 |
| **6** | 1 | 6 | 5 | 11 | 9 | 4 | 10 | 2 | 3 | 7 | 8 | 12 |
| **7** | 2 | 5 | 11 | 10 | 7 | 6 | 1 | 8 | 3 | 4 | 12 | 9 |
| **8** | 1 | 3 | 5 | 11 | 2 | 10 | 6 | 9 | 4 | 8 | 7 | 12 |
| **9** | 3 | 2 | 12 | 8 | 4 | 5 | 1 | 6 | 10 | 11 | 7 | 9 |
| **10** | 1 | 2 | 10 | 12 | 3 | 8 | 7 | 4 | 5 | 6 | 11 | 9 |
| **11** | 1 | 11 | 9 | 7 | 8 | 4 | 2 | 6 | 5 | 3 | 10 | 12 |
| **12** | 3 | 8 | 1 | 6 | 5 | 10 | 4 | 2 | 7 | 12 | 9 | 11 |
| | 19 | 57 | 101 | 111 | 70 | 74 | 45 | 71 | 62 | 86 | 111 | 129 |

Appendix VIII.3

*Task*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 7 | 3 | 9 | 11 | 5 | 4 | 6 | 8 | 1 | 10 | 2 | 12 |
| **2** | 6 | 2 | 10 | 12 | 5 | 8 | 1 | 9 | 3 | 4 | 11 | 7 |
| **3** | 2 | 8 | 12 | 9 | 7 | 6 | 1 | 4 | 5 | 3 | 10 | 11 |
| **4** | 6 | 10 | 3 | 7 | 5 | 8 | 2 | 4 | 1 | 12 | 9 | 11 |
| **5** | 3 | 6 | 10 | 12 | 5 | 4 | 1 | 9 | 2 | 8 | 11 | 7 |
| **6** | 1 | 5 | 9 | 10 | 6 | 12 | 7 | 8 | 2 | 3 | 4 | 11 |
| **7** | 1 | 2 | 12 | 11 | 7 | 8 | 9 | 5 | 4 | 6 | 3 | 10 |
| **8** | 3 | 5 | 11 | 12 | 7 | 8 | 1 | 4 | 2 | 6 | 10 | 9 |
| **9** | 1 | 11 | 6 | 12 | 4 | 8 | 5 | 3 | 2 | 7 | 9 | 10 |
| **10** | 1 | 5 | 10 | 11 | 9 | 7 | 3 | 8 | 2 | 4 | 6 | 12 |
| **11** | 2 | 8 | 11 | 10 | 1 | 6 | 5 | 7 | 9 | 3 | 4 | 12 |
| **12** | 1 | 5 | 10 | 7 | 6 | 3 | 4 | 8 | 2 | 9 | 11 | 12 |
| | 34 | 70 | 113 | 124 | 67 | 82 | 45 | 77 | 35 | 75 | 90 | 124 |

Appendix VIII.4

*Task*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 1 | 7 | 11 | 10 | 8 | 2 | 4 | 3 | 5 | 6 | 9 | 12 |
| **2** | 1 | 8 | 11 | 10 | 5 | 6 | 2 | 4 | 3 | 7 | 9 | 12 |
| **3** | 4 | 3 | 8 | 9 | 6 | 2 | 1 | 11 | 5 | 12 | 10 | 7 |
| **4** | 1 | 3 | 8 | 11 | 10 | 7 | 6 | 9 | 2 | 5 | 4 | 12 |
| **5** | 2 | 8 | 9 | 10 | 3 | 6 | 4 | 1 | 5 | 7 | 11 | 12 |
| **6** | 3 | 5 | 10 | 11 | 6 | 9 | 8 | 7 | 1 | 2 | 4 | 12 |
| **7** | 4 | 6 | 5 | 1 | 10 | 8 | 3 | 9 | 2 | 11 | 12 | 7 |
| **8** | 1 | 4 | 12 | 11 | 7 | 10 | 2 | 6 | 3 | 5 | 8 | 9 |
| **9** | 5 | 10 | 1 | 8 | 2 | 6 | 3 | 9 | 7 | 4 | 11 | 12 |
| **10** | 1 | 7 | 3 | 8 | 2 | 10 | 5 | 4 | 6 | 9 | 11 | 12 |
| **11** | 1 | 2 | 10 | 11 | 7 | 9 | 4 | 8 | 3 | 5 | 6 | 12 |
| **12** | 3 | 6 | 11 | 12 | 1 | 7 | 5 | 4 | 8 | 2 | 10 | 9 |
| **13** | 5 | 2 | 8 | 9 | 10 | 4 | 6 | 12 | 1 | 3 | 7 | 11 |
| | 32 | 71 | 107 | 121 | 77 | 86 | 53 | 87 | 51 | 78 | 112 | 139 |

Appendix VIII.5

*Task*

| *Subject* | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 1 | 3 | 7 | 12 | 8 | 6 | 5 | 9 | 2 | 10 | 4 | 11 |
| **2** | 1 | 11 | 8 | 9 | 5 | 2 | 6 | 3 | 4 | 7 | 12 | 10 |
| **3** | 5 | 3 | 11 | 12 | 1 | 9 | 7 | 2 | 8 | 6 | 4 | 10 |
| **4** | 1 | 2 | 10 | 9 | 11 | 7 | 6 | 5 | 3 | 4 | 12 | 8 |
| **5** | 1 | 3 | 9 | 10 | 5 | 8 | 2 | 4 | 7 | 11 | 6 | 12 |
| **6** | 5 | 10 | 3 | 4 | 1 | 7 | 9 | 2 | 8 | 6 | 12 | 11 |
| **7** | 3 | 8 | 10 | 7 | 2 | 4 | 1 | 9 | 6 | 5 | 11 | 12 |
| **8** | 2 | 7 | 6 | 10 | 1 | 8 | 5 | 4 | 3 | 9 | 11 | 12 |
| **9** | 3 | 1 | 12 | 9 | 6 | 10 | 5 | 8 | 7 | 4 | 2 | 11 |
| **10** | 2 | 8 | 10 | 11 | 1 | 7 | 3 | 4 | 5 | 6 | 9 | 12 |
| **11** | 1 | 7 | 8 | 9 | 5 | 10 | 6 | 4 | 2 | 3 | 11 | 12 |
| **12** | 6 | 3 | 9 | 7 | 5 | 2 | 1 | 12 | 4 | 8 | 10 | 11 |
| **13** | 1 | 8 | 10 | 12 | 4 | 2 | 5 | 6 | 3 | 7 | 11 | 9 |
| **14** | 2 | 3 | 11 | 10 | 9 | 8 | 1 | 5 | 4 | 6 | 7 | 12 |
| | 34 | 77 | 124 | 131 | 64 | 90 | 62 | 77 | 66 | 92 | 122 | 153 |

Appendix VIII.6

*Task*

| *Subject* | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 9 | 3 | 8 | 10 | 7 | 11 | 4 | 6 | 5 | 2 | 1 | 12 |
| **2** | 12 | 4 | 3 | 2 | 11 | 9 | 10 | 6 | 7 | 5 | 8 | 1 |
| **3** | 7 | 5 | 1 | 2 | 4 | 9 | 11 | 8 | 10 | 6 | 3 | 12 |
| **4** | 12 | 6 | 3 | 10 | 9 | 8 | 5 | 1 | 2 | 7 | 11 | 4 |
| **5** | 5 | 1 | 4 | 7 | 12 | 11 | 3 | 9 | 6 | 8 | 2 | 10 |
| **6** | 12 | 4 | 6 | 10 | 11 | 8 | 2 | 7 | 9 | 5 | 1 | 3 |
| **7** | 8 | 1 | 3 | 10 | 9 | 11 | 6 | 7 | 5 | 4 | 2 | 12 |
| **8** | 10 | 2 | 4 | 11 | 5 | 7 | 12 | 9 | 6 | 3 | 1 | 8 |
| **9** | 11 | 4 | 1 | 10 | 12 | 3 | 7 | 2 | 8 | 5 | 6 | 9 |
| **10** | 12 | 1 | 5 | 4 | 11 | 7 | 9 | 8 | 10 | 3 | 2 | 6 |
| **11** | 9 | 5 | 1 | 12 | 3 | 10 | 7 | 2 | 6 | 4 | 11 | 8 |
| **12** | 12 | 4 | 3 | 11 | 10 | 5 | 1 | 8 | 6 | 2 | 9 | 7 |
| **13** | 12 | 3 | 1 | 2 | 11 | 8 | 7 | 5 | 9 | 4 | 10 | 6 |
| | 131 | 43 | 43 | 101 | 115 | 107 | 84 | 78 | 89 | 58 | 67 | 98 |

**Appendix IX. Data obtained from the experiment proper as to individual subjects' indications on the 0–70 communication scales of the amount of communication received by them from individual fellow group members.**

Appendix IX.1

*Communication Received*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | | 64 | 45 | 46 | 68 | 35 | 52 | 26 | 0 | 55 | 64 | 56 | 47 | 55 | 46 | 35 |
| **2** | 32 | | 43 | 30 | 63 | 51 | 33 | 39 | 37 | 33 | 32 | 58 | 33 | 70 | 40 | 42 |
| **3** | 42 | 36 | | 38 | 67 | 56 | 42 | 66 | 39 | 29 | 43 | 47 | 19 | 31 | 25 | 14 |
| **4** | 21 | 68 | 25 | | 64 | 23 | 63 | 11 | 9 | 0 | 13 | 39 | 39 | 70 | 31 | 54 |
| **5** | 59 | 54 | 36 | 56 | | 25 | 46 | 37 | 23 | 44 | 33 | 63 | 17 | 54 | 58 | 23 |
| **6** | 40 | 51 | 70 | 19 | 35 | | 18 | 35 | 70 | 35 | 35 | 35 | 20 | 41 | 35 | 51 |
| **7** | 53 | 57 | 35 | 38 | 62 | 0 | | 57 | 0 | 47 | 70 | 54 | 54 | 70 | 59 | 0 |
| **8** | 43 | 43 | 58 | 42 | 5 | 57 | 45 | | 0 | 30 | 49 | 10 | 6 | 26 | 35 | 22 |
| **9** | 5 | 17 | 15 | 8 | 8 | 35 | 1 | 4 | | 7 | 8 | 15 | 8 | 4 | 8 | 7 |
| **10** | 60 | 53 | 53 | 45 | 53 | 45 | 59 | 53 | 54 | | 47 | 53 | 44 | 60 | 53 | 57 |
| **11** | 50 | 50 | 31 | 17 | 37 | 36 | 40 | 52 | 20 | 15 | | 18 | 4 | 48 | 1 | 32 |
| **12** | 62 | 62 | 30 | 19 | 70 | 24 | 53 | 35 | 12 | 28 | 25 | | 52 | 70 | 59 | 23 |
| **13** | 53 | 17 | 15 | 10 | 16 | 32 | 52 | 8 | 3 | 27 | 5 | 62 | | 37 | 41 | 4 |
| **14** | 58 | 54 | 12 | 60 | 54 | 32 | 38 | 32 | 29 | 37 | 49 | 59 | 41 | | 21 | 11 |
| **15** | 28 | 44 | 49 | 13 | 41 | 49 | 34 | 39 | 31 | 21 | 40 | 62 | 26 | 24 | | 37 |
| **16** | 44 | 64 | 0 | 63 | 42 | 68 | 30 | 4 | 68 | 11 | 68 | 66 | 24 | 21 | 68 | |

Appendix IX.2

*Communication Received*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | | 64 | 44 | 44 | 50 | 65 | 61 | 39 | 46 | 65 | 43 | 50 |
| **2** | 56 | | 22 | 37 | 38 | 27 | 66 | 50 | 21 | 67 | 59 | 33 |
| **3** | 28 | 52 | | 39 | 38 | 51 | 47 | 28 | 30 | 50 | 47 | 50 |
| **4** | 30 | 32 | 36 | | 23 | 42 | 30 | 66 | 60 | 22 | 44 | 39 |
| **5** | 33 | 31 | 25 | 35 | | 13 | 30 | 53 | 39 | 35 | 26 | 38 |
| **6** | 57 | 52 | 57 | 18 | 41 | | 38 | 23 | 64 | 55 | 27 | 20 |
| **7** | 49 | 65 | 57 | 39 | 39 | 57 | | 57 | 26 | 43 | 63 | 28 |
| **8** | 10 | 70 | 5 | 70 | 23 | 39 | 69 | | 35 | 21 | 70 | 70 |
| **9** | 38 | 38 | 54 | 61 | 44 | 60 | 38 | 38 | | 45 | 42 | 58 |
| **10** | 69 | 69 | 58 | 30 | 41 | 35 | 55 | 30 | 38 | | 41 | 37 |
| **11** | 43 | 68 | 47 | 47 | 42 | 46 | 70 | 68 | 42 | 64 | | 47 |
| **12** | 25 | 32 | 62 | 52 | 55 | 38 | 53 | 29 | 41 | 10 | 9 | |

Appendix IX.3

*Communication Received*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | | 45 | 51 | 45 | 40 | 39 | 64 | 12 | 55 | 48 | 53 | 35 |
| **2** | 43 | | 42 | 52 | 30 | 42 | 40 | 54 | 52 | 37 | 52 | 55 |
| **3** | 41 | 20 | | 4 | 47 | 29 | 46 | 21 | 66 | 2 | 70 | 35 |
| **4** | 54 | 0 | 35 | | 65 | 22 | 35 | 35 | 35 | 67 | 18 | 65 |
| **5** | 45 | 37 | 37 | 51 | | 29 | 40 | 52 | 45 | 52 | 62 | 67 |
| **6** | 15 | 50 | 38 | 16 | 34 | | 47 | 35 | 55 | 16 | 56 | 54 |
| **7** | 35 | 35 | 70 | 70 | 35 | 35 | | 52 | 35 | 35 | 35 | 70 |
| **8** | 5 | 41 | 18 | 55 | 35 | 51 | 50 | | 62 | 2 | 53 | 53 |
| **9** | 65 | 69 | 68 | 13 | 39 | 64 | 65 | 45 | | 22 | 57 | 70 |
| **10** | 62 | 37 | 55 | 68 | 68 | 66 | 53 | 19 | 59 | | 69 | 70 |
| **11** | 53 | 53 | 68 | 42 | 24 | 65 | 35 | 12 | 35 | 8 | | 50 |
| **12** | 29 | 8 | 43 | 58 | 44 | 41 | 11 | 60 | 62 | 12 | 53 | |

Appendix IX.4

*Communication Received*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | | 46 | 42 | 40 | 57 | 61 | 38 | 40 | 35 | 69 | 56 | 69 | 35 |
| **2** | 48 | | 42 | 41 | 42 | 37 | 57 | 70 | 42 | 64 | 58 | 36 | 50 |
| **3** | 68 | 33 | | 37 | 68 | 58 | 50 | 17 | 68 | 68 | 46 | 69 | 38 |
| **4** | 15 | 45 | 35 | | 35 | 23 | 43 | 35 | 35 | 70 | 46 | 26 | 70 |
| **5** | 52 | 39 | 63 | 23 | | 69 | 39 | 31 | 26 | 44 | 68 | 66 | 32 |
| **6** | 70 | 7 | 18 | 52 | 70 | | 16 | 10 | 35 | 52 | 35 | 18 | 19 |
| **7** | 35 | 46 | 41 | 26 | 40 | 26 | | 39 | 47 | 38 | 18 | 50 | 37 |
| **8** | 40 | 70 | 38 | 66 | 48 | 35 | 41 | | 40 | 70 | 62 | 52 | 29 |
| **9** | 9 | 59 | 64 | 37 | 7 | 7 | 66 | 64 | | 65 | 60 | 6 | 65 |
| **10** | 61 | 70 | 45 | 70 | 67 | 42 | 45 | 70 | 35 | | 40 | 53 | 58 |
| **11** | 37 | 68 | 60 | 27 | 56 | 60 | 43 | 57 | 13 | 55 | | 41 | 38 |
| **12** | 67 | 35 | 67 | 35 | 66 | 35 | 52 | 43 | 42 | 67 | 25 | | 28 |
| **13** | 5 | 38 | 47 | 65 | 36 | 35 | 55 | 48 | 64 | 62 | 41 | 2 | |

Appendix IX.5

*Communication Received*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | | 17 | 16 | 52 | 35 | 35 | 65 | 35 | 51 | 64 | 52 | 35 | 53 | 35 |
| **2** | 0 | | 58 | 36 | 35 | 59 | 9 | 47 | 11 | 42 | 61 | 31 | 18 | 20 |
| **3** | 5 | 33 | | 44 | 49 | 54 | 35 | 65 | 42 | 34 | 54 | 33 | 35 | 56 |
| **4** | 16 | 44 | 54 | | 44 | 59 | 62 | 69 | 70 | 35 | 59 | 24 | 54 | 35 |
| **5** | 6 | 68 | 66 | 70 | | 45 | 43 | 70 | 68 | 49 | 69 | 53 | 60 | 70 |
| **6** | 0 | 70 | 69 | 35 | 35 | | 19 | 40 | 18 | 48 | 69 | 23 | 30 | 50 |
| **7** | 31 | 38 | 32 | 32 | 45 | 44 | | 33 | 53 | 43 | 47 | 41 | 21 | 26 |
| **8** | 45 | 57 | 52 | 49 | 60 | 55 | 55 | | 60 | 54 | 57 | 59 | 39 | 54 |
| **9** | 43 | 36 | 42 | 42 | 69 | 41 | 64 | 60 | | 36 | 40 | 64 | 63 | 50 |
| **10** | 23 | 50 | 42 | 52 | 50 | 18 | 57 | 27 | 28 | | 58 | 25 | 31 | 4 |
| **11** | 22 | 50 | 45 | 37 | 53 | 36 | 32 | 64 | 34 | 61 | | 42 | 36 | 30 |
| **12** | 13 | 35 | 12 | 35 | 35 | 35 | 54 | 70 | 54 | 54 | 54 | | 35 | 35 |
| **13** | 61 | 41 | 67 | 62 | 61 | 44 | 49 | 69 | 64 | 67 | 64 | 56 | | 54 |
| **14** | 14 | 49 | 61 | 44 | 63 | 52 | 31 | 45 | 40 | 23 | 35 | 24 | 38 | |

Appendix IX.6

*Communication Received*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | | 46 | 52 | 45 | 39 | 42 | 62 | 40 | 47 | 30 | 47 | 45 | 52 |
| **2** | 61 | | 30 | 40 | 40 | 44 | 50 | 58 | 44 | 49 | 54 | 40 | 16 |
| **3** | 40 | 12 | | 1 | 35 | 23 | 46 | 55 | 50 | 4 | 44 | 52 | 63 |
| **4** | 52 | 57 | 39 | | 62 | 64 | 58 | 39 | 32 | 48 | 38 | 48 | 32 |
| **5** | 51 | 7 | 37 | 44 | | 39 | 49 | 33 | 51 | 38 | 32 | 51 | 43 |
| **6** | 39 | 38 | 49 | 26 | 32 | | 50 | 47 | 40 | 30 | 31 | 60 | 45 |
| **7** | 70 | 17 | 65 | 12 | 53 | 41 | | 58 | 54 | 22 | 68 | 54 | 67 |
| **8** | 38 | 4 | 45 | 16 | 18 | 43 | 44 | | 56 | 31 | 41 | 45 | 43 |
| **9** | 35 | 35 | 44 | 18 | 54 | 35 | 70 | 35 | | 35 | 54 | 70 | 54 |
| **10** | 55 | 27 | 57 | 42 | 28 | 54 | 57 | 54 | 57 | | 53 | 57 | 58 |
| **11** | 44 | 5 | 60 | 17 | 22 | 17 | 44 | 49 | 57 | 26 | | 55 | 64 |
| **12** | 6 | 1 | 12 | 4 | 2 | 9 | 14 | 7 | 12 | 4 | 8 | | 17 |
| **13** | 47 | 7 | 63 | 7 | 39 | 29 | 48 | 65 | 62 | 17 | 48 | 39 | |

Appendix IX.7

*Communication Received*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | | 67 | 53 | 64 | 38 | 66 | 52 | 64 | 54 | 46 | 43 | 70 | 44 | 64 | 61 | 46 |
| **2** | 53 | | 48 | 42 | 54 | 51 | 43 | 50 | 32 | 49 | 46 | 36 | 46 | 40 | 50 | 39 |
| **3** | 62 | 45 | | 49 | 37 | 51 | 65 | 38 | 39 | 26 | 70 | 70 | 70 | 65 | 62 | 54 |
| **4** | 38 | 35 | 42 | | 33 | 70 | 70 | 40 | 64 | 60 | 44 | 60 | 70 | 55 | 64 | 44 |
| **5** | 53 | 70 | 64 | 47 | | 60 | 53 | 55 | 37 | 58 | 70 | 65 | 47 | 48 | 70 | 52 |
| **6** | 41 | 44 | 42 | 43 | 35 | | 49 | 32 | 32 | 35 | 52 | 33 | 25 | 39 | 31 | 32 |
| **7** | 28 | 40 | 50 | 29 | 42 | 25 | | 46 | 31 | 49 | 17 | 32 | 54 | 25 | 39 | 54 |
| **8** | 43 | 43 | 43 | 38 | 39 | 44 | 47 | | 29 | 38 | 43 | 45 | 38 | 36 | 36 | 29 |
| **9** | 55 | 27 | 32 | 40 | 21 | 37 | 54 | 30 | | 50 | 59 | 52 | 55 | 70 | 40 | 55 |
| **10** | 43 | 38 | 44 | 53 | 12 | 50 | 55 | 29 | 64 | | 20 | 18 | 44 | 39 | 52 | 53 |
| **11** | 47 | 38 | 38 | 35 | 42 | 51 | 44 | 2 | 25 | 21 | | 51 | 21 | 51 | 10 | 8 |
| **12** | 11 | 40 | 30 | 2 | 5 | 21 | 36 | 0 | 0 | 0 | 13 | | 0 | 35 | 27 | 0 |
| **13** | 38 | 25 | 51 | 52 | 15 | 35 | 41 | 35 | 60 | 48 | 32 | 35 | | 35 | 48 | 49 |
| **14** | 35 | 35 | 35 | 27 | 12 | 27 | 39 | 35 | 5 | 12 | 9 | 16 | 6 | | 35 | 6 |
| **15** | 40 | 48 | 35 | 39 | 35 | 44 | 43 | 37 | 43 | 25 | 48 | 29 | 43 | 40 | | 38 |
| **16** | 53 | 61 | 57 | 59 | 31 | 39 | 52 | 45 | 70 | 70 | 66 | 45 | 54 | 37 | 37 | |

Appendix IX.8

*Communication Received*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | | 35 | 51 | 42 | 35 | 68 | 40 | 33 | 47 | 67 | 66 |
| **2** | 70 | | 65 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| **3** | 55 | 31 | | 69 | 31 | 54 | 67 | 26 | 43 | 35 | 35 |
| **4** | 23 | 35 | 35 | | 46 | 24 | 35 | 70 | 14 | 47 | 61 |
| **5** | 30 | 70 | 35 | 68 | | 35 | 30 | 10 | 21 | 42 | 16 |
| **6** | 70 | 47 | 63 | 64 | 47 | | 39 | 39 | 62 | 53 | 49 |
| **7** | 41 | 42 | 54 | 43 | 53 | 54 | | 68 | 40 | 60 | 54 |
| **8** | 30 | 13 | 15 | 3 | 42 | 45 | 70 | | 25 | 52 | 50 |
| **9** | 48 | 38 | 53 | 31 | 39 | 47 | 53 | 8 | | 53 | 23 |
| **10** | 63 | 68 | 70 | 69 | 69 | 67 | 66 | 66 | 66 | | 69 |
| **11** | 18 | 35 | 0 | 43 | 26 | 35 | 44 | 0 | 0 | 70 | |

Appendix IX.9

*Communication Received*

| *Subject* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 69 | 52 | 9 | 20 | 44 | 44 | 52 | 20 | 65 |
| 2 | 35 | | 35 | 13 | 35 | 35 | 56 | 52 | 0 | 34 |
| 3 | 64 | 67 | | 67 | 68 | 68 | 65 | 69 | 63 | 62 |
| 4 | 33 | 57 | 55 | | 50 | 57 | 62 | 49 | 53 | 28 |
| 5 | 33 | 52 | 55 | 59 | | 44 | 37 | 67 | 36 | 22 |
| 6 | 65 | 70 | 60 | 69 | 40 | | 67 | 49 | 25 | 2 |
| 7 | 35 | 70 | 35 | 70 | 53 | 70 | | 63 | 52 | 5 |
| 8 | 16 | 68 | 69 | 68 | 69 | 69 | 68 | | 68 | 19 |
| 9 | 7 | 12 | 17 | 40 | 54 | 18 | 40 | 8 | | 4 |
| 10 | 39 | 52 | 31 | 15 | 14 | 53 | 14 | 17 | 17 | |

**Appendix X. Data obtained from mutual sociometric evaluations of the ability of dyadic partners to work together by the individual subjects involved in all separate dyads from the separate experimental groups.**

Appendix X.1

| *Subject Dyad* | *Sociometric Scores assigned dyadic partner* | | *Dyad* | *Scores* | | *Dyad* | *Scores* | | *Dyad* | *Scores* | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1– 2 | 3 | 4 | 9–13 | 4 | 2 | 2– 9 | 3 | 5 | 6– 9 | 5 | 5 |
| 3–16 | 3 | 1 | 12–10 | 2 | 3 | 16–10 | 1 | 3 | 5–10 | 3 | 4 |
| 4–15 | 2 | 1 | 1–4 | 2 | 3 | 15–11 | 3 | 3 | 4–11 | 3 | 3 |
| 5–14 | 4 | 5 | 5– 3 | 4 | 4 | 14–12 | 4 | 4 | 3–12 | 1 | 3 |
| 6–13 | 4 | 4 | 6– 2 | 4 | 4 | 1– 6 | 3 | 4 | 2–13 | 3 | 3 |
| 7–12 | 4 | 4 | 7–16 | 2 | 3 | 7– 5 | 5 | 5 | 16–14 | 4 | 3 |
| 8–11 | 3 | 3 | 8–15 | 4 | 3 | 8– 4 | 1 | 2 | 1– 8 | 3 | 3 |
| 9–10 | 3 | 4 | 14– 9 | 2 | 4 | 9– 3 | 3 | 2 | 9– 7 | 4 | 1 |
| 1–12 | 1 | 4 | 10–13 | 4 | 2 | 10– 2 | 3 | 3 | 10– 6 | 4 | 4 |
| 2– 3 | 4 | 5 | 11–12 | 3 | 3 | 11–16 | 3 | 4 | 11– 5 | 4 | 3 |
| 16– 4 | 1 | 4 | 1–14 | 4 | 4 | 12–15 | 3 | 4 | 12– 4 | 3 | 3 |
| 15– 5 | 1 | 4 | 4– 5 | 4 | 4 | 13–14 | 3 | 4 | 13– 3 | 3 | 3 |
| 14– 6 | 5 | 3 | 3– 6 | 4 | 5 | 1–16 | 3 | 4 | 14– 2 | 4 | 5 |
| 13– 7 | 5 | 3 | 2– 7 | 4 | 4 | 6– 7 | 4 | 2 | 15–16 | 4 | 4 |
| 12– 8 | 3 | 2 | 16– 8 | 2 | 5 | 5– 8 | 3 | 3 | 11– 1 | 5 | 4 |
| 11– 9 | 2 | 5 | 9–15 | 1 | 3 | 4– 9 | 2 | 3 | 8– 9 | 3 | 3 |
| 3– 1 | 4 | 3 | 14–10 | 4 | 5 | 3–10 | 1 | 5 | 7–10 | 3 | 4 |
| 4– 2 | 5 | 1 | 13–11 | 3 | 3 | 2–11 | 3 | 4 | 6–11 | 4 | 4 |
| 5–16 | 3 | 3 | 5– 1 | 4 | 4 | 16–12 | 4 | 2 | 5–12 | 5 | 5 |
| 6–15 | 3 | 5 | 6– 4 | 1 | 2 | 15–13 | 5 | 4 | 4–13 | 4 | 1 |
| 7–14 | 4 | 5 | 7– 3 | 4 | 3 | 7– 1 | 4 | 4 | 3–14 | 3 | 2 |
| 8–13 | 4 | 3 | 8– 2 | 4 | 4 | 8– 6 | 4 | 4 | 2–15 | 3 | 4 |
| 12– 9 | 2 | 4 | 16– 9 | 4 | 5 | 9– 5 | 4 | 4 | 9– 1 | 3 | 3 |
| 10–11 | 4 | 4 | 10–15 | 1 | 3 | 10– 4 | 4 | 1 | 10– 8 | 4 | 3 |
| 13– 1 | 5 | 5 | 11–14 | 4 | 4 | 11– 3 | 4 | 3 | 11– 7 | 4 | 3 |
| 3– 4 | 4 | 3 | 12–13 | 4 | 4 | 12– 2 | 3 | 4 | 12– 6 | 3 | 3 |
| 2– 5 | 5 | 4 | 15– 1 | 3 | 2 | 13–16 | 3 | 3 | 13– 5 | 3 | 3 |
| 16– 6 | 5 | 4 | 5– 6 | 3 | 3 | 14–15 | 3 | 3 | 14– 4 | 2 | 5 |
| 15– 7 | 4 | 4 | 4– 7 | 4 | 4 | 1–10 | 4 | 5 | 15– 3 | 2 | 2 |
| 14–8 | 4 | 2 | 3– 8 | 4 | 1 | 7–8 | 4 | 4 | 16– 2 | 3 | 5 |

Appendix X.2

| *Subject* | *Sociometric Scores* | | *Dyad* | *Scores* | | *Dyad* | *Scores* | |
|---|---|---|---|---|---|---|---|---|
| 2– 1 | 4 | 4 | 1–12 | 3 | 3 | 1– 7 | 5 | 4 |
| 12– 3 | 3 | 2 | 4– 5 | 3 | 4 | 6– 8 | 4 | 3 |
| 11– 4 | 5 | 4 | 6– 3 | 3 | 3 | 5– 9 | 3 | 4 |
| 5–10 | 5 | 4 | 7– 2 | 5 | 4 | 10– 4 | 2 | 3 |
| 6– 9 | 2 | 5 | 12– 8 | 4 | 5 | 11– 3 | 2 | 3 |
| 7– 8 | 4 | 4 | 9–11 | 2 | 2 | 12– 2 | 3 | 3 |
| 10– 1 | 5 | 3 | 5– 1 | 2 | 4 | | | |
| 3– 2 | 3 | 3 | 4– 6 | 4 | 3 | | | |
| 12– 4 | 5 | 3 | 3– 7 | 3 | 4 | | | |
| 5–11 | 4 | 3 | 2– 8 | 4 | 3 | | | |
| 6–10 | 4 | 1 | 9–12 | 3 | 1 | | | |
| 7– 9 | 3 | 4 | 10–11 | 3 | 3 | | | |
| 1– 3 | 3 | 2 | 8– 1 | 3 | 3 | | | |
| 4– 2 | 3 | 3 | 5– 6 | 4 | 5 | | | |
| 12– 5 | 4 | 3 | 4– 7 | 3 | 4 | | | |
| 11– 6 | 3 | 2 | 3– 8 | 3 | 3 | | | |
| 7–10 | 3 | 4 | 2– 9 | 2 | 3 | | | |
| 8– 9 | 2 | 4 | 10–12 | 3 | 2 | | | |
| 1–11 | 3 | 2 | 1– 6 | 3 | 4 | | | |
| 3– 4 | 3 | 2 | 7– 5 | 4 | 3 | | | |
| 2– 5 | 3 | 5 | 4– 8 | 5 | 4 | | | |
| 12– 6 | 2 | 4 | 3– 9 | 2 | 2 | | | |
| 11– 7 | 3 | 5 | 2–10 | 4 | 5 | | | |
| 8–10 | 3 | 4 | 11–12 | 3 | 3 | | | |
| 1– 4 | 2 | 2 | 9– 1 | 4 | 2 | | | |
| 3– 5 | 4 | 2 | 7– 6 | 3 | 1 | | | |
| 6– 2 | 4 | 3 | 8– 5 | 2 | 4 | | | |
| 12– 7 | 4 | 3 | 4– 9 | 4 | 5 | | | |
| 8–11 | 4 | 3 | 10– 3 | 5 | 4 | | | |
| 9–10 | 3 | 4 | 11– 2 | 4 | 3 | | | |

Appendix X.3

| *Subject Dyad* | *Sociometric Scores assigned dyadic partner* | | *Dyad* | *Scores* | |
|---|---|---|---|---|---|
| 1– 2 | 5 | 4 | 10– 9 | 4 | 1 |
| 12– 3 | 3 | 5 | 5– 1 | 3 | 2 |
| 11– 4 | 5 | 2 | 6– 4 | 2 | 3 |
| 10– 5 | 4 | 2 | 7– 3 | 3 | 3 |
| 9– 6 | 5 | 5 | 8–12 | 4 | 5 |
| 8– 7 | 4 | 3 | 9–11 | 4 | 4 |
| 1– 9 | 4 | 4 | 12– 1 | 2 | 2 |
| 2– 3 | 3 | 4 | 5– 6 | 2 | 2 |
| 4–12 | 5 | 1 | 4– 7 | 4 | 2 |
| 5–11 | 4 | 3 | 2– 8 | 3 | 4 |
| 10– 6 | 4 | 1 | 9–12 | 5 | 5 |
| 7– 9 | 4 | 4 | 10–11 | 4 | 2 |
| 3– 1 | 4 | 3 | 1– 6 | 3 | 2 |
| 2– 4 | 3 | 4 | 7– 5 | 3 | 4 |
| 12– 5 | 4 | 5 | 3– 8 | 2 | 2 |
| 11– 6 | 4 | 3 | 9– 2 | 4 | 4 |
| 7–10 | 2 | 2 | 12–10 | 2 | 3 |
| 10– 1 | 5 | 3 | 6– 7 | 4 | 3 |
| 4– 3 | 3 | 3 | 8– 4 | 3 | 3 |
| 5– 2 | 4 | 2 | 3– 9 | 4 | 4 |
| 6–12 | 5 | 4 | 10– 2 | 2 | 2 |
| 11– 7 | 3 | 5 | 11–12 | 4 | 4 |
| 9– 8 | 4 | 5 | 7– 1 | 3 | 4 |
| 1– 4 | 3 | 4 | 5– 8 | 4 | 3 |
| 3– 5 | 4 | 4 | 9– 4 | 2 | 3 |
| 6– 2 | 3 | 4 | 3–10 | 2 | 2 |
| 12– 7 | 3 | 4 | 11– 2 | 4 | 3 |
| 8–10 | 1 | 1 | 1– 8 | 2 | 3 |
| 1–11 | 4 | 5 | 6– 8 | 4 | 4 |
| 4– 5 | 4 | 4 | 5– 9 | 4 | 4 |
| 3– 6 | 4 | 3 | 4–10 | 4 | 5 |
| 2– 7 | 4 | 4 | 3–11 | 5 | 4 |
| 11– 8 | 2 | 4 | 2–12 | 3 | 3 |

Appendix X.4

| *Subject Dyad* | *Sociometric Scores assigned dyadic partner* | | *Dyad* | *Scores* | | *Dyad* | *Scores* | |
|---|---|---|---|---|---|---|---|---|
| 1– 2 | 4 | 5 | 4– 1 | 2 | 3 | 1– 6 | 4 | 4 |
| 3–13 | 4 | 3 | 3– 5 | 5 | 3 | 5– 7 | 3 | 4 |
| 12– 4 | 4 | 2 | 2– 6 | 2 | 2 | 4– 8 | 3 | 5 |
| 11– 5 | 4 | 4 | 7–13 | 4 | 3 | 9– 3 | 2 | 4 |
| 10– 6 | 3 | 4 | 8–12 | 3 | 4 | 2–10 | 5 | 5 |
| 9– 7 | 5 | 4 | 11– 9 | 2 | 4 | 13–11 | 4 | 2 |
| 10– 1 | 5 | 4 | 1–12 | 3 | 5 | 8– 1 | 2 | 3 |
| 2– 3 | 4 | 3 | 5– 4 | 3 | 3 | 7– 6 | 3 | 2 |
| 13– 4 | 3 | 5 | 6– 3 | 1 | 3 | 8– 5 | 4 | 2 |
| 12– 5 | 4 | 3 | 2– 7 | 5 | 3 | 9– 4 | 2 | 3 |
| 6–11 | 3 | 3 | 8–13 | 3 | 1 | 10– 3 | 4 | 4 |
| 10– 7 | 4 | 2 | 12– 9 | 4 | 1 | 11– 2 | 5 | 4 |
| 8– 9 | 3 | 3 | 11–10 | 4 | 4 | 12–13 | 2 | 2 |
| 3– 1 | 3 | 2 | 1– 5 | 4 | 2 | 7– 1 | 4 | 3 |
| 2– 4 | 4 | 3 | 4– 6 | 3 | 2 | 6– 8 | 2 | 3 |
| 13– 5 | 3 | 5 | 7– 3 | 3 | 3 | 5– 9 | 2 | 2 |
| 6–12 | 1 | 2 | 2– 8 | 5 | 5 | 4–10 | 3 | 5 |
| 7–11 | 3 | 3 | 13– 9 | 1 | 3 | 3–11 | 3 | 4 |
| 10– 8 | 5 | 3 | 12–10 | 4 | 4 | 12– 2 | 4 | 4 |
| 1–11 | 3 | 4 | 1–13 | 2 | 4 | 1– 9 | 2 | 3 |
| 4– 3 | 4 | 2 | 5– 6 | 4 | 4 | 7– 8 | 1 | 4 |
| 5– 2 | 3 | 5 | 4– 7 | 3 | 3 | 9– 6 | 2 | 3 |
| 6–13 | 4 | 3 | 3– 8 | 1 | 2 | 5–10 | 3 | 5 |
| 12– 7 | 4 | 3 | 9– 2 | 4 | 4 | 11– 4 | 3 | 4 |
| 8–11 | 4 | 4 | 10–13 | 4 | 5 | 3–12 | 4 | 1 |
| 9–10 | 3 | 3 | 11–12 | 3 | 3 | 13– 2 | 3 | 4 |

Appendix X.5

| *Subject Dyad* | *Sociometric Scores assigned dyadic partner* | | *Dyad* | *Scores* | | *Dyad* | *Scores* | |
|---|---|---|---|---|---|---|---|---|
| 1– 2 | 2 | 3 | 6– 2 | 3 | 4 | 10– 2 | 3 | 4 |
| 3–14 | 4 | 5 | 7–14 | 4 | 4 | 11–14 | 3 | 3 |
| 4–13 | 2 | 2 | 8–13 | 2 | 4 | 12–13 | 3 | 5 |
| 5–12 | 5 | 2 | 9–12 | 5 | 5 | 9– 1 | 4 | 3 |
| 6–11 | 4 | 5 | 10–11 | 4 | 3 | 6– 7 | 4 | 4 |
| 7–10 | 4 | 5 | 13– 1 | 3 | 4 | 5– 8 | 4 | 4 |
| 8– 9 | 4 | 3 | 4– 5 | 4 | 4 | 4– 9 | 3 | 2 |
| 11– 1 | 1 | 3 | 3– 6 | 4 | 4 | 3–10 | 4 | 3 |
| 2– 3 | 4 | 4 | 2– 7 | 3 | 2 | 2–11 | 5 | 1 |
| 14– 4 | 3 | 5 | 14– 8 | 3 | 4 | 14–12 | 2 | 2 |
| 13– 5 | 2 | 3 | 13– 9 | 2 | 4 | 1– 7 | 4 | 4 |
| 12– 6 | 4 | 4 | 12–10 | 4 | 4 | 8– 6 | 3 | 3 |
| 11– 7 | 4 | 4 | 1– 5 | 1 | 1 | 9– 5 | 5 | 5 |
| 10– 8 | 4 | 3 | 6– 4 | 3 | 4 | 10– 4 | 4 | 3 |
| 1– 3 | 2 | 2 | 7– 3 | 3 | 4 | 11– 3 | 4 | 3 |
| 4– 2 | 3 | 4 | 8– 2 | 3 | 5 | 12– 2 | 3 | 4 |
| 5–14 | 4 | 4 | 9–14 | 4 | 4 | 13–14 | 5 | 3 |
| 6–13 | 2 | 3 | 10–13 | 2 | 3 | 10– 1 | 2 | 4 |
| 7–12 | 3 | 4 | 11–12 | 4 | 5 | 7– 8 | 2 | 3 |
| 8–11 | 3 | 5 | 14– 1 | 3 | 4 | 6–9 | 4 | 3 |
| 9–10 | 3 | 3 | 5– 6 | 4 | 3 | 5–10 | 2 | 3 |
| 12– 1 | 1 | 3 | 4– 7 | 3 | 4 | 4–11 | 2 | 3 |
| 3– 4 | 4 | 3 | 3– 8 | 4 | 4 | 3–12 | 4 | 2 |
| 2– 5 | 3 | 3 | 2– 9 | 3 | 4 | 2–13 | 3 | 3 |
| 14– 6 | 3 | 4 | 14–10 | 3 | 1 | 1– 8 | 3 | 3 |
| 13– 7 | 1 | 2 | 13–11 | 4 | 3 | 9– 7 | 4 | 5 |
| 12– 8 | 5 | 4 | 1– 6 | 3 | 2 | 10– 6 | 3 | 2 |
| 11– 9 | 4 | 4 | 7– 5 | 3 | 2 | 11– 5 | 2 | 4 |
| 1– 4 | 4 | 3 | 8– 4 | 2 | 1 | 12– 4 | 3 | 1 |
| 5– 3 | 4 | 4 | 9– 3 | 3 | 4 | 13– 3 | 3 | 3 |
| | | | | | | 14– 2 | 3 | 3 |

Appendix X.6

| *Subject Dyad* | *Sociometric Scores assigned dyadic partner* | | *Dyad* | *Scores* | |
|---|---|---|---|---|---|
| 1– 2 | 3 | 5 | 5– 1 | 4 | 3 |
| 13– 3 | 4 | 5 | 6– 4 | 4 | 4 |
| 12– 4 | 2 | 4 | 7– 3 | 4 | 5 |
| 11– 5 | 2 | 2 | 8– 2 | 2 | 4 |
| 10– 6 | 3 | 1 | 13– 9 | 5 | 3 |
| 9– 7 | 5 | 3 | 12–10 | 3 | 5 |
| 1–10 | 3 | 4 | 13– 1 | 3 | 4 |
| 2– 3 | 4 | 3 | 5– 6 | 3 | 4 |
| 4–13 | 1 | 2 | 4– 7 | 3 | 3 |
| 5–12 | 4 | 4 | 3– 8 | 4 | 5 |
| 6–11 | 1 | 3 | 2– 9 | 4 | 2 |
| 7–10 | 2 | 3 | 10–13 | 4 | 4 |
| 8– 9 | 4 | 3 | 11–12 | 4 | 3 |
| 3– 1 | 4 | 4 | 1– 6 | 3 | 1 |
| 4– 2 | 4 | 2 | 7– 5 | 4 | 4 |
| 13– 5 | 4 | 3 | 8– 4 | 3 | 2 |
| 12– 6 | 3 | 3 | 9– 3 | 4 | 4 |
| 11– 7 | 4 | 4 | 10– 2 | 2 | 4 |
| 10– 8 | 4 | 2 | 13–11 | 4 | 5 |
| 11– 1 | 3 | 5 | 1– 8 | 4 | 3 |
| 3– 4 | 2 | 3 | 6– 7 | 3 | 3 |
| 2– 5 | 4 | 1 | 5– 8 | 3 | 3 |
| 6–13 | 4 | 3 | 4– 9 | 3 | 3 |
| 7–12 | 4 | 4 | 3–10 | 3 | 4 |
| 8–11 | 5 | 4 | 2–11 | 4 | 2 |
| 9–10 | 3 | 3 | 12–13 | 3 | 2 |
| 1– 4 | 3 | 3 | 7– 1 | 5 | 5 |
| 5– 3 | 3 | 4 | 8– 6 | 4 | 4 |
| 6– 2 | 2 | 3 | 9– 5 | 4 | 5 |
| 13– 7 | 3 | 4 | 10– 4 | 3 | 2 |
| 12– 8 | 3 | 4 | 11– 3 | 4 | 3 |
| 11– 9 | 4 | 1 | 12– 2 | 2 | 4 |
| 1–12 | 4 | 3 | 9– 1 | 3 | 4 |
| 4– 5 | 4 | 2 | 7– 8 | 4 | 4 |
| 3– 6 | 4 | 4 | 6– 9 | 4 | 2 |
| 2– 7 | 4 | 2 | 5–10 | 3 | 2 |
| 8–13 | 1 | 5 | 4–11 | 4 | 3 |
| 9–12 | 2 | 4 | 3–12 | 3 | 3 |
| 10–11 | 3 | 4 | 2–13 | 1 | 1 |

Appendix X.7

| *Subject Dyad* | *Sociometric Scores assigned dyadic partner* | | *Dyad* | *Scores* | | *Dyad* | *Scores* | | *Dyad* | *Scores* | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1– 2 | 4 | 2 | 13– 9 | 5 | 4 | 9– 2 | 1 | 2 | 9– 6 | 4 | 3 |
| 3–16 | 3 | 3 | 10–12 | 2 | 3 | 10–16 | 5 | 4 | 10– 5 | 2 | 3 |
| 15– 4 | 3 | 4 | 4– 1 | 3 | 3 | 11–15 | 5 | 3 | 4–11 | 3 | 4 |
| 5–14 | 4 | 3 | 3– 5 | 3 | 4 | 14–12 | 4 | 3 | 12– 3 | 4 | 5 |
| 13– 6 | 3 | 4 | 2– 6 | 4 | 2 | 1– 6 | 4 | 3 | 13– 2 | 3 | 3 |
| 7–12 | 2 | 4 | 7–16 | 4 | 4 | 7– 5 | 1 | 3 | 16–14 | 4 | 3 |
| 11– 8 | 2 | 4 | 8–15 | 4 | 3 | 8– 4 | 3 | 2 | 8– 1 | 2 | 2 |
| 9–10 | 3 | 4 | 9–14 | 5 | 5 | 3– 9 | 2 | 3 | 9– 7 | 5 | 4 |
| 1–12 | 5 | 5 | 10–13 | 4 | 4 | 2–10 | 3 | 2 | 6–10 | 4 | 4 |
| 2– 3 | 4 | 3 | 11–12 | 2 | 4 | 16–11 | 5 | 4 | 11– 5 | 2 | 4 |
| 16– 4 | 4 | 3 | 14– 1 | 3 | 4 | 12–15 | 4 | 2 | 12– 4 | 2 | 3 |
| 15– 5 | 3 | 4 | 5– 4 | 3 | 1 | 13–14 | 3 | 4 | 3–13 | 4 | 4 |
| 14– 6 | 4 | 5 | 6– 3 | 3 | 4 | 16– 1 | 3 | 3 | 14– 2 | 2 | 4 |
| 7–13 | 4 | 4 | 2– 7 | 3 | 3 | 6– 7 | 2 | 4 | 15–16 | 3 | 4 |
| 12– 8 | 2 | 3 | 8–16 | 4 | 1 | 8– 5 | 2 | 3 | 1–11 | 2 | 3 |
| 9–11 | 4 | 3 | 15– 9 | 3 | 4 | 4– 9 | 4 | 4 | 8– 9 | 3 | 3 |
| 1– 3 | 3 | 4 | 14–10 | 4 | 3 | 10– 3 | 4 | 1 | 7–10 | 2 | 5 |
| 4– 2 | 1 | 3 | 13–11 | 3 | 4 | 2–11 | 5 | 3 | 6–11 | 3 | 4 |
| 5–16 | 3 | 3 | 5– 1 | 3 | 2 | 12–16 | 3 | 1 | 12– 5 | 3 | 4 |
| 6–15 | 4 | 5 | 4– 6 | 4 | 5 | 15–13 | 4 | 4 | 13– 4 | 4 | 5 |
| 14– 7 | 5 | 3 | 7–3 | 4 | 4 | 1– 7 | 4 | 3 | 3–14 | 4 | 4 |
| 8–13 | 2 | 2 | 2– 8 | 5 | 5 | 6– 8 | 4 | 4 | 15– 2 | 3 | 3 |
| 12– 9 | 2 | 2 | 16– 9 | 4 | 3 | 5– 9 | 1 | 2 | 9– 1 | 3 | 2 |
| 11–10 | 4 | 3 | 10–15 | 4 | 3 | 10– 4 | 4 | 5 | 10– 8 | 2 | 3 |
| 13– 1 | 3 | 4 | 14–11 | 3 | 3 | 11– 3 | 3 | 3 | 11– 7 | 4 | 2 |
| 3– 4 | 4 | 3 | 12–13 | 4 | 4 | 2–12 | 2 | 3 | 6–12 | 2 | 5 |
| 5– 2 | 5 | 4 | 15– 1 | 4 | 5 | 13–16 | 4 | 3 | 5–13 | 2 | 2 |
| 16– 6 | 4 | 2 | 5– 6 | 4 | 2 | 15–14 | 4 | 4 | 4–14 | 3 | 3 |
| 7–15 | 4 | 5 | 4– 7 | 4 | 4 | 1–10 | 4 | 3 | 3–15 | 4 | 4 |
| 8–14 | 2 | 3 | 3– 8 | 2 | 3 | 7– 8 | 5 | 4 | 16– 2 | 4 | 4 |

Appendix X.8

| *Subject Dyad* | *Sociometric Scores assigned dyadic partner* | | *Dyad* | *Scores* | |
|---|---|---|---|---|---|
| 1– 2 | 4 | 4 | 11– 1 | 3 | 4 |
| 3–11 | 5 | 2 | 4– 5 | 5 | 5 |
| 4–10 | 4 | 4 | 3– 6 | 3 | 4 |
| 5– 9 | 2 | 3 | 2– 7 | 2 | 2 |
| 6– 8 | 1 | 4 | 11– 8 | 2 | 3 |
| 9– 1 | 3 | 2 | 10– 9 | 3 | 4 |
| 2– 3 | 4 | 3 | 1– 5 | 4 | 3 |
| 11– 4 | 4 | 4 | 6– 4 | 4 | 4 |
| 10– 5 | 4 | 4 | 7– 3 | 4 | 2 |
| 9– 6 | 2 | 4 | 8– 2 | 3 | 1 |
| 8– 7 | 5 | 5 | 9–11 | 2 | 1 |
| 1– 3 | 4 | 3 | 7– 1 | 2 | 3 |
| 4– 2 | 5 | 5 | 5– 6 | 4 | 3 |
| 5–11 | 2 | 3 | 4– 7 | 2 | 2 |
| 6–10 | 4 | 4 | 3– 8 | 1 | 3 |
| 7– 9 | 3 | 2 | 2– 9 | 2 | 3 |
| 10– 1 | 3 | 4 | 11–10 | 5 | 4 |
| 3– 4 | 5 | 4 | 1– 6 | 5 | 5 |
| 2– 5 | 5 | 5 | 7– 5 | 4 | 3 |
| 11– 6 | 4 | 4 | 8– 4 | 3 | 1 |
| 10– 7 | 3 | 3 | 9– 3 | 3 | 1 |
| 9– 8 | 1 | 1 | 10– 2 | 4 | 4 |
| 1– 4 | 4 | 4 | 8– 1 | 4 | 1 |
| 5– 3 | 4 | 3 | 6– 7 | 1 | 1 |
| 6– 2 | 3 | 4 | 5– 8 | 2 | 4 |
| 7–11 | 2 | 4 | 4– 9 | 2 | 3 |
| 8–10 | 4 | 2 | 3–10 | 4 | 5 |
| | | | 2–11 | 3 | 4 |

Appendix X.9

| *Subject Dyad* | *Sociometric Scores assigned dyadic partner* | | *Dyad* | *Scores* | |
|---|---|---|---|---|---|
| 1– 2 | 4 | 3 | 6– 2 | 5 | 5 |
| 3–10 | 3 | 2 | 7–10 | 2 | 3 |
| 4– 9 | 4 | 4 | 8– 9 | 3 | 3 |
| 5– 8 | 3 | 3 | 10– 1 | 4 | 5 |
| 6– 7 | 4 | 4 | 4– 5 | 4 | 4 |
| 8– 1 | 2 | 3 | 3– 6 | 4 | 4 |
| 2– 3 | 3 | 4 | 2– 7 | 4 | 4 |
| 10– 4 | 3 | 1 | 10– 8 | 3 | 3 |
| 9– 5 | 4 | 4 | 1– 5 | 4 | 3 |
| 8– 6 | 2 | 2 | 6– 4 | 4 | 4 |
| 1– 3 | 4 | 2 | 7– 3 | 3 | 3 |
| 4– 2 | 1 | 4 | 8– 2 | 3 | 4 |
| 5–10 | 2 | 2 | 9–10 | 1 | 3 |
| 6– 9 | 4 | 3 | 7– 1 | 1 | 1 |
| 7– 8 | 4 | 4 | 5– 6 | 3 | 4 |
| 9– 1 | 2 | 3 | 4– 7 | 3 | 5 |
| 3– 4 | 3 | 3 | 3– 8 | 4 | 4 |
| 2– 5 | 4 | 3 | 2– 9 | 3 | 3 |
| 10– 6 | 1 | 1 | 1– 6 | 4 | 3 |
| 9– 7 | 4 | 4 | 7– 5 | 3 | 4 |
| 1– 4 | 1 | 2 | 8– 4 | 3 | 4 |
| 5– 3 | 3 | 4 | 9– 3 | 4 | 3 |
| | | | 10– 2 | 3 | 4 |

**Appendix XI. Data obtained from differential status positions in the group assigned all members of the separate experimental groups on the basis of these individual subjects' ability to work with their fellow group members by all members of the respective groups.**

Appendix XI.1

*Status assigned the rated Subject*

| *Subject rating* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 48 | 50 | 40 | 38 | 51 | 42 | 55 | 46 | 42 | 50 | 50 | 37 | 55 | 43 | 28 | 45 |
| **2** | 41 | 55 | 53 | 27 | 55 | 49 | 47 | 42 | 38 | 36 | 45 | 53 | 42 | 47 | 44 | 46 |
| **3** | 44 | 55 | 46 | 46 | 52 | 51 | 53 | 47 | 38 | 30 | 44 | 38 | 49 | 46 | 39 | 42 |
| **4** | 39 | 54 | 44 | 47 | 55 | 42 | 50 | 44 | 40 | 22 | 44 | 48 | 48 | 51 | 46 | 46 |
| **5** | 51 | 55 | 54 | 46 | 56 | 36 | 55 | 36 | 39 | 33 | 36 | 58 | 31 | 52 | 49 | 33 |
| **6** | 51 | 47 | 40 | 31 | 46 | 55 | 52 | 51 | 46 | 45 | 41 | 40 | 54 | 41 | 32 | 48 |
| **7** | 54 | 51 | 36 | 44 | 58 | 42 | 51 | 48 | 31 | 41 | 44 | 39 | 45 | 53 | 44 | 39 |
| **8** | 45 | 54 | 30 | 30 | 51 | 53 | 53 | 46 | 49 | 41 | 43 | 40 | 47 | 40 | 50 | 48 |
| **9** | 44 | 47 | 35 | 31 | 52 | 55 | 48 | 43 | 56 | 35 | 46 | 54 | 48 | 43 | 39 | 44 |
| **10** | 54 | 44 | 46 | 44 | 41 | 46 | 45 | 42 | 50 | 57 | 46 | 29 | 56 | 47 | 28 | 45 |
| **11** | 52 | 42 | 46 | 33 | 51 | 49 | 54 | 45 | 38 | 46 | 53 | 50 | 41 | 48 | 38 | 34 |
| **12** | 54 | 50 | 33 | 40 | 52 | 44 | 53 | 47 | 36 | 37 | 47 | 48 | 50 | 50 | 49 | 30 |
| **13** | 53 | 48 | 45 | 33 | 48 | 46 | 56 | 46 | 38 | 32 | 49 | 43 | 48 | 50 | 41 | 44 |
| **14** | 38 | 54 | 35 | 34 | 51 | 48 | 48 | 43 | 40 | 48 | 51 | 44 | 46 | 55 | 44 | 41 |
| **15** | 50 | 50 | 46 | 26 | 36 | 47 | 50 | 48 | 48 | 35 | 46 | 39 | 53 | 48 | 48 | 50 |
| **16** | 51 | 47 | 35 | 29 | 50 | 49 | 50 | 46 | 42 | 36 | 48 | 45 | 52 | 51 | 43 | 46 |

Appendix XI.2

*Status assigned the rated subject*

| *Subject rating* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 35 | 38 | 30 | 31 | 34 | 25 | 39 | 34 | 26 | 32 | 34 | 38 |
| **2** | 30 | 36 | 34 | 35 | 27 | 32 | 33 | 35 | 28 | 38 | 35 | 33 |
| **3** | 25 | 40 | 32 | 39 | 33 | 35 | 36 | 33 | 22 | 41 | 37 | 23 |
| **4** | 27 | 33 | 30 | 36 | 32 | 34 | 36 | 35 | 35 | 31 | 32 | 35 |
| **5** | 35 | 35 | 27 | 36 | 39 | 31 | 31 | 34 | 25 | 35 | 35 | 33 |
| **6** | 38 | 35 | 30 | 29 | 35 | 36 | 30 | 36 | 28 | 33 | 30 | 36 |
| **7** | 31 | 42 | 25 | 39 | 33 | 25 | 42 | 34 | 24 | 25 | 42 | 34 |
| **8** | 34 | 34 | 30 | 36 | 31 | 24 | 33 | 36 | 27 | 35 | 36 | 40 |
| **9** | 38 | 29 | 34 | 34 | 29 | 34 | 32 | 37 | 39 | 29 | 30 | 31 |
| **10** | 34 | 34 | 30 | 33 | 33 | 20 | 36 | 35 | 34 | 41 | 31 | 35 |
| **11** | 35 | 39 | 31 | 33 | 37 | 28 | 33 | 33 | 22 | 37 | 33 | 35 |
| **12** | 32 | 36 | 36 | 39 | 34 | 33 | 35 | 31 | 23 | 33 | 30 | 34 |

Appendix XI.3

*Status assigned the rated subject*

| *Subject rating* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 35 | 41 | 38 | 37 | 25 | 40 | 40 | 24 | 36 | 37 | 38 | 25 |
| **2** | 36 | 35 | 36 | 35 | 29 | 38 | 41 | 39 | 36 | 25 | 29 | 37 |
| **3** | 42 | 38 | 40 | 32 | 37 | 33 | 24 | 24 | 35 | 25 | 42 | 36 |
| **4** | 35 | 28 | 34 | 39 | 34 | 35 | 38 | 31 | 32 | 34 | 26 | 38 |
| **5** | 39 | 28 | 34 | 35 | 40 | 32 | 35 | 37 | 37 | 24 | 31 | 32 |
| **6** | 34 | 29 | 38 | 26 | 35 | 34 | 34 | 33 | 41 | 27 | 33 | 38 |
| **7** | 37 | 33 | 36 | 28 | 33 | 38 | 36 | 27 | 35 | 31 | 31 | 29 |
| **8** | 31 | 35 | 32 | 31 | 36 | 35 | 36 | 38 | 37 | 25 | 34 | 36 |
| **9** | 37 | 36 | 36 | 25 | 33 | 37 | 34 | 31 | 41 | 24 | 36 | 36 |
| **10** | 37 | 29 | 34 | 38 | 39 | 37 | 34 | 25 | 35 | 36 | 35 | 29 |
| **11** | 37 | 41 | 33 | 39 | 29 | 36 | 33 | 23 | 31 | 28 | 40 | 36 |
| **12** | 34 | 34 | 37 | 26 | 37 | 35 | 30 | 32 | 39 | 25 | 36 | 35 |

Appendix XI.4

*Status assigned the rated subject*

| *Subject rating* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 37 | 40 | 29 | 41 | 44 | 38 | 34 | 34 | 28 | 38 | 34 | 35 | 36 |
| **2** | 40 | 51 | 37 | 35 | 41 | 23 | 36 | 32 | 33 | 36 | 38 | 29 | 37 |
| **3** | 38 | 31 | 39 | 26 | 39 | 32 | 34 | 25 | 42 | 44 | 34 | 43 | 41 |
| **4** | 29 | 42 | 37 | 38 | 47 | 36 | 27 | 27 | 32 | 31 | 42 | 39 | 41 |
| **5** | 32 | 32 | 27 | 37 | 37 | 41 | 40 | 39 | 35 | 35 | 34 | 34 | 45 |
| **6** | 43 | 33 | 25 | 40 | 43 | 32 | 32 | 30 | 39 | 45 | 39 | 25 | 42 |
| **7** | 40 | 40 | 37 | 30 | 43 | 33 | 37 | 23 | 43 | 22 | 37 | 36 | 47 |
| **8** | 34 | 40 | 30 | 40 | 40 | 38 | 41 | 41 | 27 | 32 | 41 | 38 | 26 |
| **9** | 37 | 40 | 31 | 36 | 38 | 27 | 41 | 32 | 34 | 41 | 39 | 34 | 38 |
| **10** | 31 | 41 | 33 | 33 | 40 | 31 | 34 | 34 | 35 | 51 | 42 | 32 | 31 |
| **11** | 40 | 38 | 38 | 32 | 37 | 41 | 37 | 35 | 29 | 28 | 41 | 37 | 35 |
| **12** | 38 | 38 | 19 | 39 | 37 | 26 | 36 | 43 | 42 | 40 | 32 | 41 | 37 |
| **13** | 40 | 41 | 37 | 34 | 38 | 35 | 36 | 32 | 29 | 39 | 39 | 33 | 35 |

Appendix XI.5

*Status assigned the rated subject*

| *Subject rating* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 40 | 37 | 34 | 34 | 36 | 42 | 40 | 42 | 45 | 42 | 46 | 33 | 42 | 33 |
| **2** | 24 | 48 | 42 | 39 | 42 | 41 | 34 | 45 | 40 | 42 | 43 | 46 | 29 | 31 |
| **3** | 28 | 36 | 48 | 35 | 41 | 44 | 40 | 45 | 40 | 43 | 30 | 49 | 29 | 38 |
| **4** | 35 | 41 | 36 | 37 | 42 | 44 | 35 | 40 | 43 | 42 | 41 | 33 | 32 | 45 |
| **5** | 24 | 43 | 44 | 40 | 45 | 42 | 34 | 41 | 43 | 35 | 38 | 46 | 29 | 42 |
| **6** | 34 | 38 | 42 | 31 | 40 | 42 | 46 | 45 | 47 | 27 | 38 | 41 | 35 | 40 |
| **7** | 35 | 41 | 41 | 32 | 35 | 44 | 44 | 33 | 41 | 45 | 45 | 39 | 26 | 45 |
| **8** | 29 | 43 | 42 | 23 | 43 | 42 | 35 | 42 | 47 | 43 | 44 | 44 | 27 | 42 |
| **9** | 44 | 36 | 42 | 26 | 41 | 36 | 41 | 38 | 48 | 37 | 25 | 46 | 40 | 46 |
| **10** | 37 | 30 | 47 | 39 | 43 | 40 | 39 | 39 | 41 | 41 | 40 | 43 | 34 | 33 |
| **11** | 32 | 33 | 42 | 38 | 33 | 42 | 38 | 40 | 39 | 39 | 42 | 44 | 42 | 42 |
| **12** | 23 | 41 | 38 | 34 | 32 | 41 | 45 | 47 | 44 | 39 | 48 | 43 | 37 | 34 |
| **13** | 42 | 41 | 41 | 39 | 32 | 38 | 34 | 40 | 33 | 39 | 41 | 43 | 40 | 43 |
| **14** | 33 | 42 | 48 | 40 | 35 | 38 | 38 | 43 | 48 | 34 | 36 | 37 | 31 | 43 |

Appendix XI.6

*Status assigned the rated subject*

| *Subject rating* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 45 | 21 | 40 | 30 | 26 | 32 | 44 | 36 | 38 | 33 | 42 | 38 | 43 |
| **2** | 44 | 43 | 39 | 26 | 30 | 30 | 37 | 39 | 36 | 32 | 43 | 40 | 29 |
| **3** | 40 | 27 | 44 | 26 | 33 | 35 | 41 | 39 | 31 | 34 | 37 | 39 | 42 |
| **4** | 36 | 27 | 32 | 37 | 32 | 37 | 37 | 38 | 44 | 28 | 43 | 40 | 37 |
| **5** | 38 | 22 | 34 | 33 | 37 | 37 | 40 | 38 | 38 | 36 | 37 | 38 | 40 |
| **6** | 38 | 26 | 41 | 33 | 38 | 35 | 40 | 42 | 42 | 25 | 32 | 35 | 41 |
| **7** | 41 | 20 | 44 | 30 | 37 | 36 | 42 | 37 | 38 | 25 | 38 | 38 | 42 |
| **8** | 34 | 26 | 44 | 39 | 34 | 39 | 41 | 40 | 41 | 32 | 37 | 34 | 27 |
| **9** | 36 | 34 | 41 | 34 | 37 | 37 | 40 | 33 | 35 | 42 | 30 | 35 | 34 |
| **10** | 40 | 22 | 41 | 33 | 23 | 39 | 37 | 39 | 42 | 40 | 35 | 39 | 38 |
| **11** | 38 | 22 | 41 | 27 | 31 | 31 | 39 | 37 | 42 | 37 | 42 | 40 | 41 |
| **12** | 36 | 19 | 42 | 23 | 38 | 36 | 40 | 38 | 42 | 44 | 32 | 37 | 41 |
| **13** | 41 | 26 | 37 | 27 | 37 | 40 | 39 | 40 | 36 | 33 | 38 | 34 | 40 |

Appendix XI.7

*Status assigned the rated subject*

| *Subject rating* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 51 | 40 | 43 | 42 | 37 | 49 | 53 | 45 | 38 | 53 | 41 | 37 | 47 | 44 | 55 | 45 |
| **2** | 44 | 51 | 50 | 46 | 36 | 50 | 47 | 47 | 37 | 45 | 50 | 30 | 45 | 42 | 52 | 48 |
| **3** | 48 | 48 | 50 | 47 | 39 | 47 | 51 | 38 | 47 | 40 | 45 | 42 | 42 | 41 | 46 | 49 |
| **4** | 47 | 37 | 41 | 48 | 26 | 48 | 56 | 41 | 47 | 51 | 47 | 38 | 53 | 44 | 51 | 45 |
| **5** | 48 | 45 | 42 | 49 | 50 | 48 | 48 | 43 | 40 | 44 | 48 | 39 | 42 | 44 | 48 | 42 |
| **6** | 37 | 38 | 45 | 45 | 35 | 48 | 47 | 43 | 48 | 50 | 51 | 37 | 53 | 51 | 47 | 45 |
| **7** | 42 | 44 | 48 | 43 | 39 | 48 | 49 | 42 | 43 | 43 | 47 | 39 | 47 | 46 | 51 | 49 |
| **8** | 39 | 49 | 48 | 42 | 30 | 50 | 51 | 48 | 48 | 48 | 48 | 34 | 44 | 40 | 51 | 50 |
| **9** | 46 | 29 | 48 | 51 | 37 | 51 | 54 | 38 | 50 | 42 | 45 | 31 | 50 | 48 | 53 | 47 |
| **10** | 47 | 40 | 43 | 48 | 29 | 53 | 52 | 43 | 54 | 51 | 38 | 30 | 47 | 49 | 52 | 44 |
| **11** | 44 | 40 | 47 | 51 | 33 | 47 | 54 | 38 | 48 | 55 | 50 | 28 | 46 | 37 | 54 | 48 |
| **12** | 47 | 42 | 43 | 40 | 36 | 54 | 57 | 39 | 41 | 34 | 52 | 51 | 44 | 46 | 50 | 44 |
| **13** | 49 | 42 | 44 | 45 | 30 | 47 | 56 | 40 | 48 | 46 | 41 | 36 | 52 | 45 | 52 | 47 |
| **14** | 38 | 28 | 40 | 45 | 30 | 49 | 60 | 40 | 50 | 52 | 41 | 47 | 52 | 54 | 56 | 38 |
| **15** | 46 | 39 | 46 | 48 | 41 | 49 | 48 | 39 | 48 | 49 | 43 | 36 | 47 | 44 | 53 | 44 |
| **16** | 50 | 41 | 45 | 47 | 33 | 46 | 54 | 39 | 47 | 47 | 48 | 29 | 49 | 41 | 53 | 51 |

Appendix XI.8

*Status assigned the rated subject*

| *Subject rating* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 35 | 33 | 31 | 30 | 32 | 33 | 28 | 19 | 25 | 32 | 32 |
| **2** | 33 | 34 | 31 | 35 | 35 | 31 | 26 | 21 | 26 | 30 | 28 |
| **3** | 33 | 33 | 30 | 36 | 34 | 25 | 25 | 18 | 23 | 36 | 37 |
| **4** | 30 | 36 | 32 | 35 | 37 | 28 | 27 | 25 | 24 | 29 | 27 |
| **5** | 28 | 36 | 33 | 34 | 34 | 34 | 28 | 20 | 24 | 33 | 26 |
| **6** | 30 | 32 | 29 | 33 | 33 | 33 | 24 | 25 | 26 | 34 | 31 |
| **7** | 29 | 28 | 35 | 34 | 35 | 28 | 28 | 26 | 23 | 33 | 31 |
| **8** | 34 | 33 | 26 | 29 | 32 | 27 | 34 | 34 | 17 | 34 | 30 |
| **9** | 33 | 32 | 33 | 31 | 39 | 33 | 28 | 23 | 26 | 30 | 22 |
| **10** | 29 | 37 | 35 | 34 | 31 | 28 | 27 | 26 | 21 | 36 | 26 |
| **11** | 33 | 34 | 30 | 33 | 32 | 28 | 29 | 22 | 21 | 36 | 32 |

Appendix XI.9

*Status assigned the rated subject*

| *Subject Rating* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 29 | 30 | 28 | 26 | 28 | 28 | 23 | 26 | 29 | 23 |
| **2** | 24 | 34 | 25 | 27 | 29 | 32 | 30 | 26 | 24 | 19 |
| **3** | 21 | 28 | 30 | 28 | 32 | 28 | 29 | 28 | 24 | 22 |
| **4** | 23 | 25 | 26 | 26 | 35 | 28 | 24 | 34 | 24 | 25 |
| **5** | 20 | 30 | 29 | 29 | 29 | 27 | 30 | 29 | 29 | 18 |
| **6** | 25 | 28 | 28 | 28 | 31 | 31 | 28 | 26 | 28 | 17 |
| **7** | 20 | 27 | 24 | 33 | 26 | 29 | 30 | 29 | 32 | 20 |
| **8** | 19 | 31 | 28 | 30 | 28 | 25 | 31 | 27 | 30 | 21 |
| **9** | 24 | 30 | 28 | 30 | 28 | 27 | 27 | 29 | 28 | 19 |
| **10** | 24 | 30 | 28 | 28 | 26 | 24 | 32 | 28 | 26 | 24 |

# BIBLIOGRAPHY


1 ASCH, S.E. *Social psychology.* New York: Prentice-Hall, 1952.
2 BACK, K. W. Influence through social communications. *J. abnorm. soc. Psychol.*, 1951, **46**, 9-23.
3 BALES, R. F. *Interaction process analysis.* Cambridge: Addison-Wesley, 1950.
4 BERGEN VAN, A., AND KOEKEBAKKER, J. Group cohesiveness in laboratory experiments. *Acta Psychologica*, 1959, **16**, 84-85.
5 BOON VAN OSTADE, A. H. De iteratieve factor - analyse als eenvoudige, parametervrije, objectieve klassificatiemethode. (Iterative factor analysis: a simple, non-parametric, method of classification.) Afdeling Personeelsresearch Staatsmijnen, Nr 17 (B.v.O.), Heerlen, 26 maart, 1963. (Personnel research department. Report number 17 (B.v.O.), March, 1963. Heerlen, The Netherlands.). Unpublished. Written in Dutch.
6 CARTWRIGHT, D., AND ZANDER, A. *Group dynamics.* Evanston, Illinois: Row, Peterson, Second Edition, 1960.
7 EISMAN, B. SOME operational measures of cohesiveness and their correlations. *Hum. Relat.*, 1959, **12**, 183-89
8 FESTINGER, L. Informal social communication. *Psychol. Rev.*, 1950, **57**, 271-82.
9 FESTINGER, L., *A theory of cognitive dissonance.* Evanston, Illinois: Row, Peterson, 1957.
10 FESTINGER, L., AND THIBAUT, J. Interpersonal communication in small groups. *J. abnorm soc. Psychol.*, 1951, **46**, 92-99.
11 FESTINGER, L., SCHACHTER, S., AND BACK, K. *Social pressures in informal groups.* New York: Harper, 1950.
12 GROSS, N., AND MARTIN, W. On group cohesiveness. *Amer. J. of Sociol.*, 1952, **57**, 546-54.
13 GUILFORD, J. P. *Psychometric methods.* New York: McGraw-Hill, 1954.
14 HEIDER, F. *The psychology of interpersonal relations.* New York: Wiley, 1958.
15 JENKINS, J. G. The nomination technique as a method of evaluating air group moral. *J. of Aviation Med.*, 1948, **19**.
16 KELLEY, H. H. Communication in experimentally created hierarchies *Hum. Relat.*, 1951, **4**, 39-56.
17 KELLEY, H. H., AND THIBAUT, J. W. *The social psychology of groups.* New York: McGraw-Hill, 1959.
18 KENDALL, M. G. *Rank correlation methods.* London: Griffin, 1948, 38-39.
19 LEWIN, K. Frontiers in group dynamics. *Hum. Relat.*, 1947, **1**, 5-41.
20 LUCE, R. D., AND PERRY, A. D. A method of matrix analysis of group structure. *Psychometrika*, 1949, **14**, 95-116.
21 MANN, R. D. A review of the relationships between personality and performance in small groups. *Psychol. Bull.*, 1959, **56**, 241-70.
22 MORENO, J.L. *Who shall survive?* Washington, D.C.: Nervous and Mental Diseases Publishing Co., 1934.
23 MORONEY, M. J. *Facts from figures.* Pelican Books, A236, 1962, 260-61.
24 MULDER, M. *Mensen, groepen en organisaties.* Deel II. Van Gorcum: Assen, 1963, 9-12. *(People, groups and organizations.)* Part II, Assen: The Netherlands; Van Gorcum, 1963. Written in Dutch.
25 NEWCOMB, T. M. The prediction of interpersonal attraction. *The Amer. Psychol.*, 1956, **11**.

26 NEWCOMB, T. M. *The acquaintance process.* New York: Holt, Rinehart and Winston, 1961.
27 NOBLE, C. E. Scale reliability and the Spearman-Brown equation. *Educ. and Psychol. Measurement.*, 1955, **15**, 195-205.
28 PENDERS, J. J. *Kadervorming in de industrie.* (Leadership training in industry.) Het Spectrum, Utrecht/Antwerpen, 1962. Written in Dutch.
29 PENDERS, J. J. Verslag experimentele cursus kadervorming beambten 1962/63. Stikstofbindingsbedrijf, Geleen, 20 maart, 1963. (Report on the experimental leadership training program for administrative personnel during 1962-'63. Nitrogen fixation plant. Geleen, The Netherlands. March 20, 1963.). Unpublished. Written in Dutch.
30 RAMUZ-NIENHUIS, W., AND BERGEN VAN, A. Relations between some components of attraction-to-group: a replication. *Hum. Relat.*, 1960, **13**, 271-77.
31 ROY, S. N., AND MITRA, S. K. An introduction to some nonparametric generalizations of analysis of variance and multivariate analysis. *Biometrika*, 1949, **43**, 361-76.
32 SCHACHTER, S. Deviation, rejection and communication. *J. of abnorm. soc. Psychol.*, 1951, **46**.
33 SCHACHTER, S. Comment. *Amer. J. of Sociol.*, 1952, **57**, 554-62
34 SCHACHTER, S. ET AL. An experimental study of cohesiveness and productivity. *Hum. Relat.*, 1951, **4**, 229-38.
35 SHERIF, M. *The psychology of social norms.*New York: Prentice-Hall, 1952.
36 SIEGEL, S. *Non-parametric statistics for the behavioral sciences.* New York: McGraw-Hill, 1956.
37 STEMERDING-BARTENS, J. De gevolgen van communicatieverstoring in arbeidsgroepen. In: Mulder, M., *Mensen, groepen, en organisaties.* Deel I. Van Gorcum: Assen, 1963, 132-66. (The consequences of interruption of communication in work groups. In: Mulder, M., *People, groups and organizations.* Assen, The Netherlands: Van Gorcum, Part I, 1963, 132-66.). Written in Dutch.
38 STEPHENSON, W. *The study of behavior: Q-technique and its methodology.* Chicago: Univ. of Chicago Press, 1953.
39 STOUFFER, S. ET AL. *The American soldier: combat and its aftermath.* Princeton, N. J.: Princeton Univ. Press, 1949.
40 TRYON, R. C. Reliability and behavior domain validity. *Psychol. Bull.*, 1957, **54**, 229-49.
41 WALKER, H., AND LEV. J. *Statistical inference.* New York: Holt, Rinehart, and Winston, 1953.
42 WHERRY, R. J., AND GAYLORD, R. H. The concept of test and item reliability in relation to factor patterns. *Psychometrika*, 1943, **8**, 247-64.
43 WHERRY, R. J., AND WINER, B. J. A method for factoring large numbers of items. *Psychometrika*, 1953, **18**, 161-79.
44 WHERRY, R. J., Campbell, J. T., and Perloff, R. An empirical verification of the Wherry-Gaylord iterative factor analysis procedure. *Psychometrika*, 1951, **16**, 67-74.
45 WINER, B. J. Iterative factor analysis: its psychological and mathematical bases. Unpublished Ph. D. dissertation. Ohio State Univ., 1952.
46 ZELENEY, L. D. Status: its measurement and control in education. *Sociometry*, 1941, **4**, 198.

# STELLINGEN

I

Alhoewel de algemene aantrekkelijkheid van de groep voor haar leden niet gelijk te stellen is met de cohaesie van de groep, blijft zij de belangrijkste bron van cohaesie.

II

Uitgaande van de aanvechtbare veronderstelling, dat een hoge mate van groepscohaesie altijd gewenst is, heeft het vraagstuk, hoe men de cohaesie van groepen kan doen verminderen in wetenschappelijk onderzoek onvoldoende aandacht gekregen.

III

Sterke cohaesie van een groep wordt meer bepaald door de onderlinge verdraagzaamheid der leden dan door de hoge waardering die zij voor elkaar hebben.

IV

Aangenomen dat de cohaesie van een groep met de duur van haar bestaan toeneemt, dringt zich de vraag op naar een genetische studie over de cohaesiekenmerken.

V

Hoe esoterischer de doeleinden zijn van een groep, des te groter is de cohaesie van de groep.

VI

De cohaesie van een groep is afhankelijk van de homogeniteit der leden in verschillende opzichten. Het ontbreken van een duidelijke kennis van deze dimensies duidt een belangrijk terrein aan voor verder onderzoek.

VII

Het werk van Sir R. A. Fisher is een zeer belangrijke bijdrage van een buitenstaander tot de wetenschappelijke psychologie. [1]

VIII

Harry Stack Sullivan's theorie over de oorsprong van de angst heeft de betreffende opvattingen van Freud toegankelijk gemaakt voor objectief wetenschappelijk onderzoek. [2]

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1 Fisher, R. A. Statistical methods for research workers. (5th Ed.) Edinburgh: Oliver & Boyd., 1934.

2 Sullivan, H. S. *The interpersonal theory of psychiatry.* (Edit. by Perry, H.S. and Gawel, M. L.). New York: Norton, 1953.

IX

Wil men het begrip sHr uit de theorie van Hull handhaven als verklaring van gedrag, dan dient men sHr niet slechts te laten bepalen door het aantal, maar ook door het patroon en de verdeling in de tijd van de beloningen (reinforcements). [3]

X

Het is statistisch niet te verdedigen, hypothesen op "two-tail"-significantie te toetsen, indien op grond van een duidelijke theoretische indicatie de richting van de te verwachten resultaten kan worden voorspeld.

XI

Vanuit behavioristisch standpunt gezien is het gedrag van een Nederlandse toerist in Valkenburg niet te onderscheiden van dat van de Amerikaanse toerist in Marken en Volendam.

Nijmegen, 5 juni 1964

G. MORAN

[3] Hull, C. L. *Principles of behavior: an introduction to behavior theory*. New York: Appleton-Century-Crofts, 1943.